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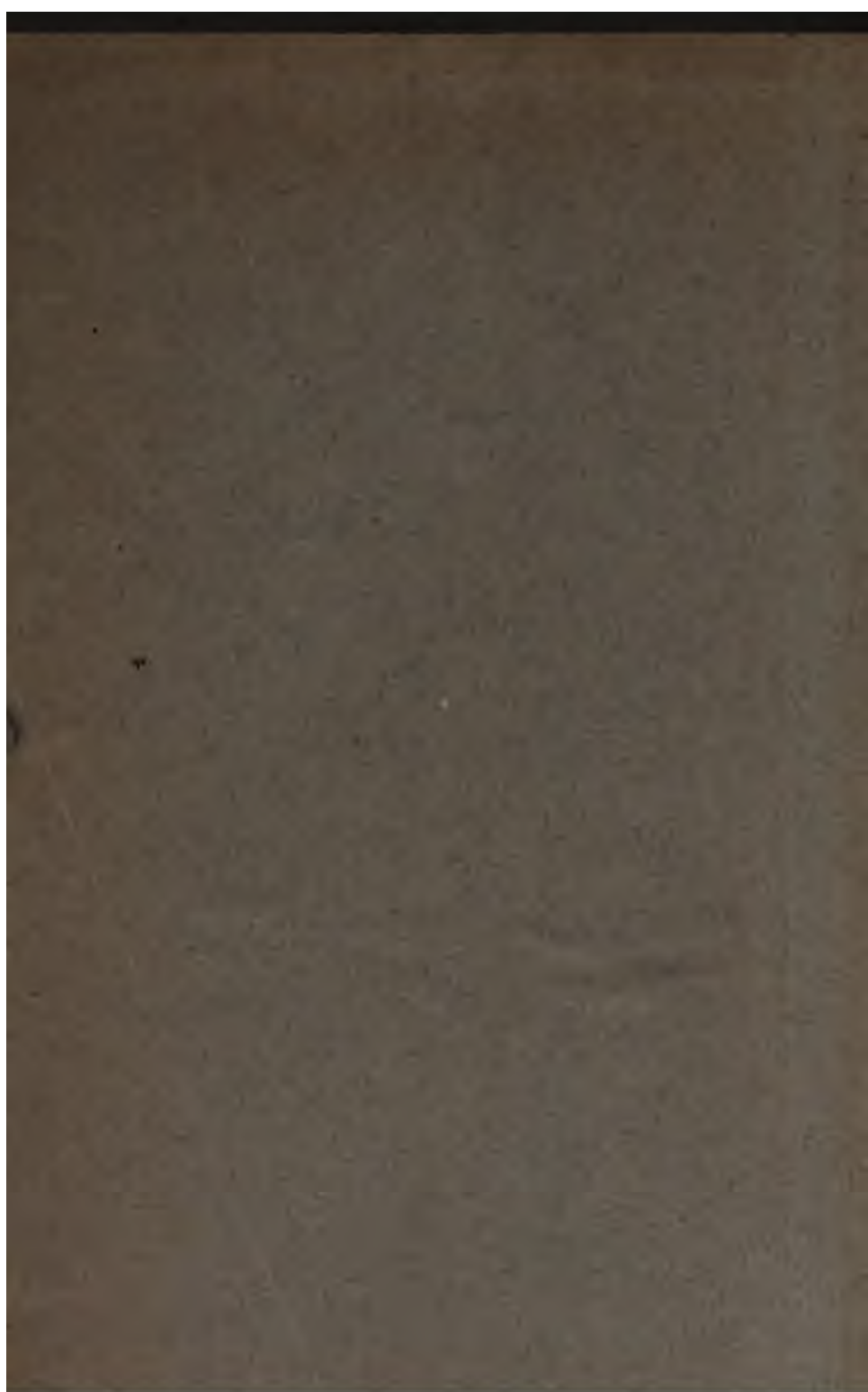
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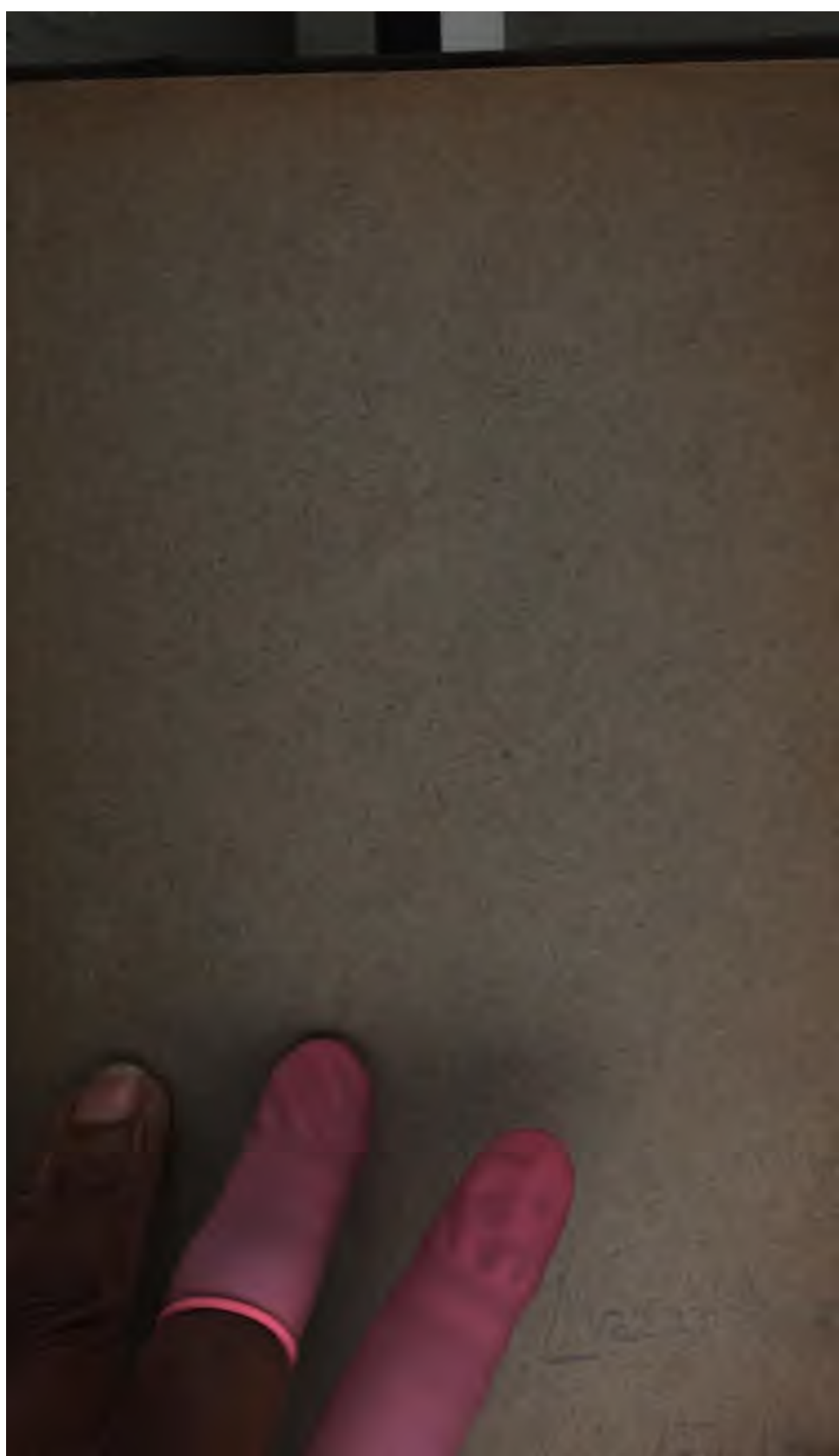
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OF THE

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Commonwealth of Massachusetts.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts:

The Board of Harbor and Land Commissioners, as required by the provisions of section 2 of chapter 19 of the Public Statutes, respectfully submit the following report of their doings in the year 1893.

The Legislature have required, by chapter 144 of the Acts of 1893, that annual reports of State boards or commissions containing recommendations or suggestions for legislative action shall be deposited with the Secretary of the Commonwealth on or before the first Wednesday in January of each year. In order to comply with this provision of law it has been necessary for this Board to end the period covered by the present report with the 30th of November instead of the 31st day of December, as in previous years. This report, therefore, covers a period of only eleven months, but hereafter the annual reports will cover a full year beginning from the 1st of December.

HEARINGS AND INSPECTIONS.

During the eleven months of 1893 ending November 30, the Board have held one hundred and five formal sessions. At these meetings one hundred and forty-three hearings were given. The Board have passed upon ninety-five applications for licenses for structures or privileges in tide waters and great ponds; of these ninety were granted, one was withdrawn by the petitioners after hearing, and four were refused. In the licenses granted suitable conditions and restrictions were imposed.

Of the above-named meetings, one in regard to the establishment of a river line at Springfield was held at that city, two in regard to the boundary line on tide water between

the towns of Mashpee and Barnstable were held at Cotuit in the town of Barnstable and one was held at Harwich in regard to certain structures in that town; the other hearings were held at the office of the Board in Boston.

The Commissioners have from time to time visited the localities where they have been asked to license structures in tide waters, or to grant privileges for using or lowering waters of great ponds. In this way the Board have during the year visited and inspected the bridge at Muddy Cove between the towns of Chatham and Harwich, the jetties at the mouth of Herring River, in the last-named town, a wharf or landing in the harbor of Marblehead, a wharf on Mystic River at Medford, certain wharves in Fall River, Vincent Cove at Gloucester, the draw in the railroad bridge at Manchester, Bartlett's and Darby ponds in Plymouth, and certain structures in Lake Quinsigamond at Worcester. The Commissioners also visited and inspected the Province Lands, now subject to their jurisdiction. The inspections named were those made by the Board, but no license is ever granted without an actual inspection of the premises, either by the Board or one of its members, or by its engineers.

SOUTH BOSTON FLATS.

The work of filling and improving the tidewater lands known as the Commonwealth's Flats, at South Boston, has continued during the year on the general plan previously followed. Substantially all the work done during the year has been upon the portion of the lands known as the seventy-five-acre lot.

The final settlement has been made with the New England Dredging Company for the work done under the contract dated April 8, 1889. In making this settlement \$7,500 was paid to the said company for additional material required to complete the filling by reason of the sinking of the original surface, the soft mud underlying the filling being here much deeper than at any place previously filled.

The contract with the San Francisco Bridge Company for dredging and filling a portion of the seventy-five-acre lot, dated Dec. 31, 1891, was completed and the final payment made in October, 1893. During the year 179,821 cubic

yards of material were dredged and deposited, most of it on the area north of Congress Street, and a small quantity on the land south of Congress Street in order to fill some low places to the required level. This work was done by the hydraulic method and in a very satisfactory manner. The completion of the work was delayed about three months beyond the contract time owing to the existence of a large number of small boulders in the material dredged, which broke the pumps very frequently and delayed the work. The presence of these boulders was not known or suspected either by the commissioners or the contractors when the contract was made. In the final settlement under the contract the San Francisco Bridge Company was paid \$609.40 for expenses incurred in the removal of these boulders.

The work under the contract with the Eastern Dredging Company for filling about 200,000 cubic yards at the northeast corner of the seventy-five-acre lot dated July 1, 1892, and extended to January 1, 1894, is now in progress. During the year 74,962 cubic yards of material have been deposited under this contract.

This work is being done by a combination process. The material is brought to the work in scows and then dug from the scows by a clam-shell dredge, and placed in a hopper on the wharf. It is then forced by water from steam pumps through a pipe to the place of deposit. This method deposits the material in such a manner that very little work is required to complete the grading of the surface.

On June 13, 1893, after public advertisement, a contract was made with Perkins & White, the lowest bidders, to fill with gravel to grade 16 D and E Streets and the cross streets between C and E Streets, at the price of 63 cents per cubic yard. [See Appendix A.] Work has been commenced under this contract, and up to Dec. 1, 1893, 7,000 cubic yards of gravel have been deposited on the streets, most of it on E Street.

On Aug. 1, 1893, a lease for 5 years was made to George C. Corcoran of 15,000 square feet of land on the southeast corner of Congress and C Streets, he agreeing to purchase the land at the expiration of the lease at the price of 80 cents per square foot, and agreeing to at once erect a large building

on the premises. This building has been built, and he is now carrying on his business there.

Early in the year Mr. Peter McConarty notified the Board that the city board of health had ordered him to discontinue the business of storing manure on the premises he had leased from the Commonwealth. Accordingly this lease was terminated by mutual agreement. Later in the year the Board was informed that the board of health had withdrawn its objections to the business carried on by Mr. McConarty, and on Oct. 10, 1893, a lot in the same location, 50 feet square, was let to him at the rent of \$60 per year, payable semi-annually in advance.

The two small lots on the northerly side of the one-hundred-acre lot are still let as stated in the last report of the Board.

During the year, the Walworth Manufacturing Company has graded its lot and enclosed it by a substantial fence, and, in addition to its large storage shed, has erected a building for the storage of naphtha.

In November the city of Boston applied for permission to build a plank sidewalk on the southerly side of Congress Street, from C Street to L Street Bridge, and such permission was granted by the Board on Nov. 10, 1893. The walk is now in process of construction.

The L Street Bridge, which was completed last December, has remained unused since that time. During the summer L Street was completed on the South Boston side from First Street to the Bridge, the roadway being paved and the edge-stones set; but no work has been done on the Boston side with the exception of the plank walk above described.

Up to the present time the New York & New England Railroad Company has successfully delayed the appointment, upon the petition of the city of Boston, of a commission, under the grade crossing act, to compel the carrying of Congress Street over the tracks of said railroad company. This has prevented the completion of Congress Street and correspondingly retarded the development of the Commonwealth's property at the South Boston flats. The importance of opening Congress Street to travel is so clear, that the city authorities can probably be relied upon to press the matter as much

as possible. In the meantime the erection of the plank walk for foot passengers is likely to call attention to the uncompleted thoroughfare.

Under the contract with the San Francisco Bridge Company, the reserved channel has been excavated to its full width of 400 feet from its head at E Street to a line 100 feet east of the easterly line of L Street and to its full depth of 12 feet below mean low water. From this point the excavated channel continues in the same direction 110 feet wide on the bottom and 12 feet deep at mean low water to a point opposite George Lawley & Sons' yacht basin; at that point it turns and runs about northeasterly 115 feet wide on the bottom and 8 feet deep at mean low water to a like depth in the main channel of the harbor.

In the spring the buoys marking this channel were renewed and set at the entrance and at the angles in the channel.

The balance in the Commonwealth's Flats improvement fund on the first day of January, 1893, available for carrying on the work was \$69,698.93. To this has been added during the year \$937.82 from the income of the fund, \$2,259.94 from rents of land and \$95,000 paid into the fund from the treasury of the Commonwealth under the provisions of chapter 93 of the Acts of 1889, and chapter 19 of the Acts of 1893, making a total of \$167,896.69. Of this sum there has been expended during the year \$88,947.23, leaving an available balance on December 1, 1893, of \$78,949.46.

It is estimated that this balance will be sufficient to pay for all the work now contracted for and also the expenses incidental to its completion. In order to provide for the remainder of the filling required to raise to the established grade the whole of the area enclosed by the present sea-wall and bulkheads, it is estimated that it will be necessary to authorize the payment of \$50,000 into the fund for the year 1894.

SURVEYS.

During the year the work on the South Boston Flats has as usual occupied a large part of the time of the engineer of the Board and his assistants. The surveys in connection with the contracts for filling have taken much time, and

the large amount of filling brought by teams has required constant attention.

Two surveys were made of the portion of the Reserved Channel dredged by the San Francisco Bridge Company, one in April, on which to base the instructions as to the final levelling of the excavation, and the other in August and September, upon the completion of the work. The bottom was found to be remarkably smooth and of even depth at the required grade.

April 28, 1893, an examination and sketch were made of the wharf of William H. Friend and the launching ways of Thomas A. Irving, in Vincent Cove, Gloucester.

May 9, 1893, a line of levels was run from Bartlett's Pond, in Plymouth, to the outlet of the mill-pond on the stream above Bartlett's Pond, to determine the comparative elevations between the floor of the outlet of the mill-pond and the natural level of Bartlett's Pond, and on October 12 copper bolts were set in rocks near the shore of Bartlett's Pond marking the level below which the pond should not be drawn under a proposed license of this Board to the Beaver Dam Cranberry Bog Company to erect structures in the outlet of the pond.

May 9, 1893, levels were taken at Darby Pond, in Plymouth, to determine the level below which the pond should not be drawn in flowing cranberry bogs.

June 8, 1893, levels were taken on Salter's Beach, near the Gurnet, in Plymouth, to compare with previous levels to see how the beach is affected, if at all, by the removal of gravel under permits given to the owner of the beach. So far as appears at present, the removal of the gravel from the proper places and in a proper manner does not injure the beach.

In June, July and August, a survey and plan were made of Popponesset Bay, in Mashpee and Barnstable, to be used in defining the boundary line on tide water between the two towns under chapter 105 of the Resolves of 1893. This took considerable time, the field work alone occupying nearly three weeks.

In July and in September and October surveys were made at Provincetown for the purpose of fixing and marking the

bounds of the Province Lands as established by chapter 470 of the Acts of 1893. Fifteen stone monuments, of substantial size and properly inscribed, were set in the places designated upon the map accompanying this report.

During the summer, between other engineering work, a hydrographic survey was made of Chelsea Creek from Meridian Street bridge to the head of navigation near Proctor's wharf in Revere. The plans of this survey are not yet completed.

October 25 and 26, a few lines of soundings were run in Neponset River to ascertain whether any changes had occurred since the survey of 1891, before making estimates of the amount of dredging required to make the channel navigable to vessels of deeper draught than those that use it now.

In November a hydrographic survey was made around Jeffries Point, East Boston, on which to base estimates for a channel from the present Bird Island channel to the wharves on the northerly side of the point as far as the Boston, Revere Beach & Lynn Railroad.

In the same month, a survey was made of the channel in South Bay, from Dover Street bridge up Roxbury Canal, on which to base estimates for the removal of certain shoals which now prevent the larger vessels from reaching the wharves.

In September surveys were made to determine the amount of filling which had been done by certain persons and corporations in South Bay, along the shore between Roxbury Canal and the New York & New England Railroad, and also in Charles River, in Cambridge between West Boston and Craigie bridges.

CHARLES RIVER.

License to Boston & Maine Railroad.

On Jan. 25, 1893, the Board granted to the Boston & Maine Railroad a very important license, authorizing it to widen a portion of its Eastern and Western Division bridges over the Charles River so as to cover the space between them with a pile structure, also to widen the passage-way for vessels in the draws of its Eastern and Southern Division bridges and to build additions to the draw-piers of those bridges,

and to repair a portion of said Eastern and Southern Division bridges and the draw-pier of said Southern Division bridge. The draw-ways covered by this license were required to have a width for the passage of vessels of 40 feet instead of 36 as before. Both in the new construction and in the repairs and rebuilding authorized the railroad company was required by the Board to place the piles in lines parallel to the current, and to remove the old piles, which were placed so as to obstruct the current and greatly to retard the flow of the river. There can be no doubt that the performance of these requirements has benefited the river, and it is thought that, with all the new piling which was authorized by the license to be placed between the bridges, the river flows more freely at this point than it did before any of the authorized changes were made.

The portion of the license, however, which authorized the widening of the two bridges so as to cover the space between them with a pile structure, was granted upon the solemn declaration of the Boston & Maine Railroad, made by the persons authorized to represent it, that it desired the license only for the purpose of erecting a temporary structure to provide for the immediate necessities of its passenger traffic until the problem of a union station and proper terminal facilities could be finally solved; and the following agreement was inserted in the license with the assent of the railroad company:—

This license is granted with the express understanding that the pile construction hereby authorized is temporary in its character, and the said Boston & Maine Railroad in accepting this license agrees with the Commonwealth of Massachusetts and with the Board of Harbor and Land Commissioners, representing said Commonwealth, that it will, as soon as the same can permanently and advantageously be done, rebuild with stone piers, in a manner to be approved by the said Board, all the bridges over the Charles River owned, leased or controlled by it, and will remove from the said river all the piles supporting any of the said bridges or hereby authorized to be driven, except such piles as may be allowed by the said Board to remain as necessary for the proper appurtenances of the said bridges or the draws therein.

Instead of building a structure providing only for the

temporary accommodation of its passenger business, the Boston & Maine Railroad, after making an agreement with the Fitchburg Railroad for a union station, proceeded to build the same at great expense and in a very substantial manner. This proceeding in no way discharges the corporation from its obligation to the Commonwealth under the contract contained in the license, although it may make the performance of that contract by the removal of the piles and the rebuilding of its bridges with stone piers more costly than it otherwise would have been. The fact that the corporation has chosen to make a large expenditure on a temporary structure, should not at any future time be allowed to furnish it with an excuse for attempting to delay the performance of its contract with the Commonwealth.

Under this license the Boston & Maine Railroad, in accordance with the recommendation of this Board to the Governor and Council, paid the Commonwealth for rights and privileges granted in tide-water lands the sum of \$75,636. This was paid on Feb. 6, 1893.

After obtaining the said license from this Board the Boston & Maine Railroad, as required by the laws of the United States, applied to the Secretary of War for approval thereof. Such approval was granted by the Secretary of War on Feb. 3, 1893, in accordance with the recommendation of Lieutenant Colonel Mansfield. In granting the said approval the Secretary of War imposed the following condition :—

That the Boston & Maine Railroad shall rebuild all its bridges over the Charles River on stone or iron piers in a manner to be approved by the War Department, and shall remove from the river all of the piles of the said bridges within ten years from the date of execution hereof.

The written instrument signed by the Secretary of War, certifying his assent and containing the foregoing condition, bears upon it the following acceptance in behalf of the Railroad Company :—

The conditions of this instrument are hereby accepted by the Boston & Maine Railroad, by Frank Jones, the chairman of the

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board, thereunto lawfully authorized, this sixth day of February, 1893.

FRANK JONES.

In presence of

A. W. SULLOWAY.

J. W. SANBORN.

Work of Charles River Embankment Company.

Owing to the financial depression, the work in Charles River Basin has not progressed during the year as fast as was expected. The work on the property of the Charles River Embankment Company has been principally done east of Harvard Bridge, where about 1,470 feet of sea-wall have been built from Harvard Bridge along the exterior line towards West Boston Bridge. About 2,000 feet of wooden bulk-head have been built on the boundary between the flats being filled and the adjacent flats. About 127,000 cubic yards of material have been deposited on the flats inclosed, a large portion of which was used in backing up the wall and bulk-head.

West of the Harvard Bridge about 77,000 cubic yards of material have been dredged from the river and deposited on the westerly and northern sides of the area already inclosed and partially filled. The general appearance of the territory west of the bridge is about the same as a year ago, the material deposited this year being used to raise the portions which were a little low. No work was done in constructing streets during the past year.

Other Work.

On the property between Broad Canal and Binney Street, the filling has been continued on both sides of First Street, and the erection of buildings upon the filled land has already begun.

Authorized Extension of the Charles River Embankment by the City of Boston.

By chapter 435 of the Acts of 1893, the act of 1891,

which authorized the city of Boston to extend the Charles River Embankment or Charlesbank to the southerly line of Mount Vernon Street and thence by a curved line southerly and westerly as this Board might approve, was amended by authorizing the continuation of such embankment by the construction of a sea-wall, parallel to and 100 feet or less distant from the sea-wall in the rear of Beacon Street, as far as the westerly line of the Back Bay Fens.

The act provides that all lands acquired and filled under authority of the act shall be subject to the express condition that they shall not be used for building purposes, or for any other purpose than for public ornamental grounds and a parkway. The third section makes proper provision for obtaining the material used for filling by dredging from the Charles River Basin in such places and to such depths as this Board shall require, and also provides that the city shall do a sufficient amount of additional dredging between high and low water lines to compensate for the amount of tide-water displaced by the filling or do other dredging in lieu thereof which in the judgment of this Board is an equal improvement to the harbor of Boston. The act provides that all the filling, dredging and other work authorized or required thereby shall be subject to the approval of this Board and likewise subject to the approval of the Secretary of War.

Claim of the Fisk Heirs.

Mary G. Fisk and Edward P. Fisk, trustee, have presented a claim to this Board based upon their alleged ownership of certain flats in Charles River south of the West Boston Bridge. They claim that the 100-rod line of riparian ownership, as measured from the shore line indicated on a certain ancient plan, entitles them to a portion of the flats which have hitherto been claimed by the Commonwealth, and that they should be paid certain sums of money which the Commonwealth has received for gravel sold from the flats claimed by them. The Board have this matter under consideration, and hope to find further ancient plans or descriptions which may throw light upon the questions involved.

MYSTIC RIVER.

The work done by the Boston & Maine Railroad during the year in connection with the Mystic Wharf improvement has consisted mainly in dredging in the dock and opposite the lower portion of the railroad company's said wharf and principally below Chelsea Bridge, to secure a depth of water sufficient to allow large ocean steamships to reach the wharf. As the wharf was already filled, the dredged material was used partly in filling the South Boston Flats under a contract of the Eastern Dredging Company with the Commonwealth and the remainder was carried out to sea. Eighty-five thousand three hundred and thirty-six cubic yards of material have been so dredged. All of this material was dredged from the north channel of the Mystic River, 17,480 cubic yards having been dredged above the Chelsea Bridge and 67,856 cubic yards below that bridge.

FORT POINT CHANNEL.

Dover Street Bridge.

On July 26, 1893, this Board granted to the city of Boston a license to rebuild a portion of Dover Street Bridge in and over the tidewaters of the Fort Point Channel, as directed by a special commission appointed under the provisions of the grade-crossing act. The Board in granting this license imposed the condition that the draw-way in said bridge should be built with an opening of not less than 40 feet at all stages of the tide for the passage of vessels, but it was further provided that until the draw-way in the bridge of the Old Colony Railroad Company over Fort Point Channel shall be rebuilt and widened, the city may maintain its water pipes temporarily in their present position on the Dover Street Bridge and draw-way, with such structures as are necessary for their support and protection, leaving a clear opening of 36 feet in the draw-way, such water pipes and temporary structures to be removed or changed by the city so as to leave a clear opening of 40 feet in the draw-way whenever such removal or change shall be ordered by the Board after hearing. The Old Colony Railroad bridge is below the Dover Street Bridge, so that the additional width in the

passageway in the Dover Street Bridge draw will be useless until the draw-way in the bridge of the Old Colony Railroad Company is correspondingly widened. Such a change is very desirable and it is hoped that the Board may be able to find some way to bring it about.

FLATS AT EAST BOSTON.

The East Boston Company and the Maverick Land Company own certain flats at East Boston which were enclosed by a sea-wall before the year 1866. These companies applied to the Board for information as to whether it was their duty to procure licenses from the Board before permitting dredged material to be dumped on their flats or making contracts for filling them. They claimed that the work of filling the portion of their flats enclosed by the sea-wall was begun at the time of the passage of the act of 1866 creating the Board of Harbor Commissioners and requiring licenses for structures in tide-water, and that the work has since been continuously prosecuted. The flats and the wall in question are those which are seen upon the right in passing between East Boston and Winthrop upon the trains of the Boston, Revere Beach & Lynn Railroad Company.

The East Boston and Maverick companies, at the request of the Board, furnished the Board with a statement of their grounds for claiming such exemption, and this statement was submitted by the Board to the Attorney-General for his opinion, particularly asking his attention to the consideration of the point whether, if the said work was begun at the time of the passage of the act of 1866, under the construction of that statute laid down by the Supreme Court in the case of *Attorney-General v. Boston & Lowell Railroad*, 118 Mass. 345, it has been since continuously prosecuted, so that a filling of the flats now can fairly be considered a part of the same work, or whether the prosecution of the old work has been so discontinued since 1866 that the present undertaking of filling the flats in question would be a new work, and would thus require a license from the Board under the provisions of chapter 19 of the Public Statutes.

In response to this inquiry the Attorney-General gave his

opinion upon the 15th of July, 1893, to the effect that, assuming the statements of fact submitted to him to be correct, the work of improving the flats in question enclosed by the wall is within the exemption of section 8 of chapter 19 of the Public Statutes. A copy of the opinion of the Attorney-General is printed in the appendix to this report. [See Appendix B.]

The Board, after receiving this opinion, notified the East Boston and Maverick companies that no licenses would be required to authorize them to fill the portions of their property enclosed by the sea-wall.

CONNECTICUT RIVER.

On April 12, 1893, the Board gave a hearing at Springfield in regard to the northerly and southerly extension of the river line on the Connecticut River already designated by the Board, as stated on page 6 of the report of the Board for the year 1892. A plan made by the city engineer of Springfield and the engineer of this Board showing the extensions of the line to be recommended was considered, and it was voted to recommend to the Legislature that the line with the extensions shown on said plan be established. This recommendation was accordingly made, and the Legislature established the line in question by chapter 301 of the Acts of 1893.

BACK BAY LANDS.

The Board have received during the year several complaints in regard to alleged violations of restrictions in the deeds of the Commonwealth conveying lots on the Back Bay lands; but in most of the cases notice of the complaint has resulted in the removal of the features principally objected to, and no action on the part of the Board has become necessary. Two of these complaints are now pending, but neither of them has reached a point where the Board can properly make a report upon it.

On November 14, 1893, the Board approved a change in the plan for laying out a portion of the lands of the Boston & Roxbury Mill Corporation between Beacon Street, Deerfield Street and the Bay State road.

REMOVAL OF WRECKS AND OBSTRUCTIONS TO NAVIGATION.

Early in the spring, complaint was made to the Board that an old hulk had been floated away from its berth and was liable to damage a brig moored at Burnham's railway wharf at East Boston. Upon investigation it was found that so much ice had formed on the wreck that it had floated, and drifted into its dangerous position. As no owner could be found, the Board had it towed to South Boston Flats to be finally disposed of later.

On March 30, 1893, Mr. A. T. Bliss of Winthrop notified the Board that an old wreck was lying off his premises at Chelsea Point, in Winthrop, which was an obstruction to navigation, and asked for its removal. Upon investigation it was found to be the bottom of the old ferry-boat "Trimountain," which after the breaking up of the boat had been left on Wood Island during the winter. The ice had formed on it until it had floated and lodged in the position reported by Mr. Bliss.

May 1, 1893, after public advertisement, a contract was made with Mr. Wendal H. Wyman, the lowest bidder, for the sum of \$467, to break up and place on shore, the two above-described wrecks, and also the wreck of an old sloop which was lying near the head of the Reserved Channel on the South Boston Flats. [See Appendix C.] The performance of this contract was satisfactorily completed June 6, 1893.

On July 29, 1893, the Harbor-master notified the Board that the schooner "Mt. Vernon" had been stripped of most of her rigging and abandoned and was drifting around in the South Bay; that she was an obstruction to navigation and was liable to do serious damage to the wharves and bridge. The Board had her towed to the South Boston Flats and made fast to the wharf there, and notified the owner to remove her. No reply was received from him, and in the mean time the vessel sank at the wharf. The Board then received bids for her removal, which were so high that they were all rejected. Oct. 24, 1893, an offer was accepted from Mr. J. R. Nash to remove the wreck for the sum of \$25 and the vessel. The work was satisfactorily completed, and paid for on Oct. 31, 1893.

Oct. 20, 1893, Mr. E. B. Townsend reported to the Board that the schooner "D. M. Anthony," while passing up Miller's River, on Oct. 16, 1893, grounded on an obstruction near Prison Point Bridge and damaged her rudder. Upon investigation, the obstruction was found to be an old oak spur-shore pile projecting from the bed of the river, lying directly in the track of vessels at a place where they are in the habit of stopping to wait for the tide. No information could be obtained as to how the pile got there. A diver was employed and the pile removed, at an expense of \$25, the payment of which was approved by the Board on Oct. 24, 1893.

Oct. 27, 1892, the Boston Rubber Company notified the Board that a wreck had floated alongside their wharf at Chelsea, and was liable to injure it. Upon inquiry it was found to be the sloop "Ino" of Boston, which had been dismantled and had drifted away from her berth. The owners were notified and removed her.

Attempt to Procure Reimbursement from the United States.

In their last annual report the Board stated that they had in contemplation an application to the United States for reimbursement of expenditures made by the Commonwealth for the removal of wrecks under the provisions of chapter 260 of the Acts of 1883, this being made the duty of the Board by the provisions of section 10 of the act. On Sept. 22, 1893, such an application was made in a letter addressed to the Secretary of War of the United States, setting forth a list of the expenditures made by the Commonwealth for the removal of wrecks constituting obstructions to international and interstate navigation, amounting to \$7,536.51, which, in the opinion of this Board, might properly be paid by the United States.

The Board, in their communication to the Secretary of War, stated that they presented the claim to him as being in charge of the harbors of the United States, in order that he might recommend such action to Congress in the matter as he thought proper, by way of providing for the payment of this claim as one of the items in the annual appropriation bill or otherwise.

The Secretary of War replied in a letter dated Oct. 2, 1893, declining to recommend the repayment by the United States of the amount thus expended by the Commonwealth, on the ground that Congress had exclusive control of the subject of the removal of wrecks, and had passed a law making all necessary provisions in regard to the matter.

To this letter the Board sent a reply dated Oct. 5, 1893, respectfully urging that, if the United States desires to reject the assistance of this Commonwealth in performing its duties in regard to the removal of wrecks, it should amend its laws so that these duties may be promptly and efficiently performed by its own officers; the fact being that under the provisions of section 4 of the act of Congress approved June 14, 1880, providing for the removal of wrecks, thirty days' notice by publication is required, and also a further time sufficient to allow the owner to remove the wreck after such notice, so that in practice it is found impossible for the United States authorities to begin the removal of a wreck sooner than forty days after receiving notice of the obstruction. This power is in many cases obviously insufficient, and the United States authorities have in several important instances been obliged to leave to this Board the removal of wrecks where immediate action was necessary.

The correspondence will be found printed in full in the appendix to this report. [See Appendix D.]

FISH WEIRS.

Section 70 of chapter 91 of the Public Statutes is as follows:—

The mayor and aldermen of a city and the selectmen of a town lying upon tide water may authorize in writing any person to construct fish-weirs in said waters within the limits of such city or town for a term not exceeding five years: *provided*, such weirs cause no obstruction to navigation, and do not encroach on the rights of other persons.

This section substantially re-enacts section 1 of chapter 50 of the Acts of 1856, which was passed ten years before the statute which created the Board of Harbor Commission-

ers and required structures in tide waters to be licensed by that Board.

In the report of the Board of Harbor and Land Commissioners for the year 1883 the commissioners discussed the effect of the law in regard to fish-weirs and commented upon its unsatisfactory condition, but did not definitely recommend any legislation on the subject. Since that time the matter has not been mentioned in the reports.

During the past year the attention of this Board was called to the matter by a complaint against certain persons for maintaining fish-weirs alleged to be obstructions to navigation within the meaning of the statute. In regard to the particular weirs complained of, the Board came to the conclusion that under the existing circumstances no action on their part was necessary; but in the course of the hearings upon the matter the practice of the selectmen of towns in regard to the granting of licenses for fish-weirs was disclosed in such a way as to throw a good deal of light upon the operation of the existing law. It seems that the selectmen, in at least one important town where licenses for fish-weirs are granted, do not grant definite licenses permitting the licensee to erect and maintain a fish-weir in a designated place, but merely give a general permission in writing to the licensee to erect and maintain a fish-weir, or in some cases more than one, anywhere in the waters within the limits of the town, providing that he causes no obstruction to navigation and does not encroach on the rights of other persons. This leaves it for the licensee to determine where his fish-weir shall be located, providing he gets the consent of the riparian proprietor to such portion of the structure as comes above low water mark, such licensee deciding for himself and at his own risk whether the structure that he erects and maintains is an obstruction to navigation within the meaning of the statute. The consequence is that fish-weirs, consisting of stakes firmly driven in the bottom and connected by nets or brush, are built from various portions of the shore into the tide waters of the Commonwealth under cover of written licenses from the selectmen of the town, and yet neither the selectmen nor any other authority has ever passed upon the question of whether the licensed weirs are obstructions to navigation or are erected in suitable places or in a proper manner.

Under the statutes now in force, no person can build a wharf, pier, dam, sea-wall or bridge in tide waters of the Commonwealth without a license from this Board. Fish-weirs are the only structures in tide water not required to be so licensed. They are structures peculiarly liable to interfere with navigation, and there seems to be at least as much reason for their being subject to a proper control as there is in case of the structures now under the jurisdiction of this Board.

The Board suggest that the above quoted section of the Public Statutes in regard to fish-weirs should be so amended that licenses for fish-weirs granted by the mayor and aldermen of a city or the selectmen of a town may be subject to the approval of this Board upon the question of obstruction to navigation, leaving to the local tribunal the decision of the question whether the city or town should grant any licenses for fish-weirs, and, if so, to how many persons and to what persons they should be granted, but requiring this Board to pass upon the questions whether the proposed structure is a proper one and to be put in a proper place with reference to navigation.

Chapter 205 of the Acts of 1893 prohibited the granting of any further licenses for constructing or maintaining fish-weirs in tide waters of Buzzard's Bay, or any harbor, cove or bight thereof, but as to the other tide waters of the Commonwealth section 70 of chapter 91 of the Public Statutes remains in force.

LICENSES AUTHORIZING STRUCTURES IN OR PRIVILEGES
AFFECTING TIDE WATERS AND GREAT PONDS, GRANTED
DURING THE ELEVEN MONTHS ENDING NOVEMBER 30,
1893.

Nos.

1531. Petition of G. H. Johnson for license to dump snow and ice from Dover Street Bridge into Fort Point Channel in the city of Boston. Granted Jan. 13, 1893.
1532. Petition of the Boston & Maine Railroad for license to widen a portion of its Eastern and Western Division Bridges, to widen the passage-way for vessels in its Eastern and Southern Division Bridges, to build additions to the draw-piers of said Eastern and Southern Division

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- Nos.
- Bridges, and to repair a portion of said Eastern and Southern Division Bridges and the draw-pier of said Southern Division Bridge on Charles River in the cities of Boston and Cambridge. Granted Jan. 25, 1893.
1533. Petition of the city of Boston for license to dump snow and ice into tide waters in the cities of Boston, Cambridge and Chelsea. Granted Feb. 2, 1893.
1534. Petition of the city of Lynn and town of Swampscott for license to build a wooden box outfall in Nahant Bay, at King's Beach, in said city and town. Granted Feb. 2, 1893.
1535. Petition of the Boston Fire Brick and Clay Retort Manufacturing Company for license to fill solid and extend its wharf, on piles, in Boston harbor near the Reserved channel at South Boston. Granted Feb. 2, 1893.
1536. Petition of the North Packing and Provision Company for license to widen its wharf, on piles, on Miller's River in the city of Somerville. Granted Feb. 2, 1893.
1537. Petition of Orlando E. Lewis for license to widen a wharf in Winthrop harbor in the town of Winthrop. Granted Feb. 2, 1893.
1538. Petition of Thomas A. Irving for license to build and maintain a launchway, on piles, in Vincent Cove in the city of Gloucester. Granted Feb. 2, 1893.
1539. Petition of the Eastern Dredging Company for license to build a sea-wall, bulkhead and pile pier, and to fill solid in Chelsea Creek at East Boston. Granted Feb. 2, 1893.
1540. Petition of Susan Pope and Julia A. Furber for license to repair their wharf and build a pile structure in their dock on Fort Point Channel in the city of Boston. Granted Feb. 2, 1893.
1541. Petition of Sylvester Cunningham and William Thompson for license to widen their wharf, on piles, in Gloucester harbor. Granted Feb. 2, 1893.
1542. Petition of DeWitt C. Bates, J. Clarence Howe and Henry O. Fairbanks, trustees of the bridges over Weymouth Fore and Back rivers, for license to widen a portion of a bridge, on piles, on Weymouth Fore River in the city of Quincy and town of Weymouth. Granted Feb. 2, 1893.
1543. Petition of the Central Wharf and Wet Dock Corporation for license to dump snow and ice into Boston harbor from Central wharf and India wharf in the city of Boston. Granted Feb. 9, 1893.

Nos.

1544. Petition of Heywood Brothers & Co. for license to fill solid in Crystal Lake in the town of Gardner. Granted Feb. 9, 1893.
1545. Petition of James J. Storrow, Jr., and others, trustees, for license to build a bulkhead, fill solid and maintain a float on Charles River in the city of Cambridge. Granted Feb. 16, 1893.
1546. Petition of the Boston & Maine Railroad for license to widen and repair a portion of its Eastern Division bridge, and to widen and extend the draw-pier of said bridge on the easterly side of Austin Street, on Charles and Miller's Rivers in the cities of Boston and Cambridge. Granted March 9, 1893.
1547. Petition of the city of Boston for license to build a foundation head-house, and to rebuild two ferry piers in Boston harbor, at the North Ferry in the city of Boston. Granted March 9, 1893.
1548. Petition of Reed & Gamage for license to extend their wharf, on piles, in Gloucester harbor in the city of Gloucester. Granted March 9, 1893.
1549. Petition of the Lynn & Boston Railroad Company for approval of plans for temporary bridges on Mystic River in the city of Boston, as authorized by chapter 374 of the Acts of 1892. Granted March 23, 1893.
1550. Petition of Alvin F. Waite and James T. Smith for license to build a breakwater in Buzzard's Bay in the town of Dartmouth. Granted March 23, 1893.
1551. Petition of H. K. Hannah for license to build a pile wharf on Weymouth Fore River in the town of Weymouth. Granted March 23, 1893.
1552. Petition of the Fall River Iron Works Company for license to widen and extend its wharf by filling solid in Taunton River in the city of Fall River. Granted March 23, 1893.
1553. Petition of Annie M. Oakes for license to widen and extend her wharf, on piles, on Chelsea Creek in the city of Chelsea. Granted March 30, 1893.
1554. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for a sewer and siphon across Shirley Gut, between Point Shirley and Deer Island, as authorized by chapter 439 of the Acts of 1889. Granted April 5, 1893.
1555. Petition of the Brookline Gas Light Company for license to build a pile wharf, to widen its present wharf, and to fill

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- Nos. solid on Charles River in the city of Boston. Granted April 5, 1893.
1556. Petition of the city of Medford for license to build a brick conduit, with a tide-gate therein, to conduct the waters of Gravelly Creek into Mystic River in said city. Granted April 13, 1893.
1557. Petition of the Bristol Manufacturing Company for license to lay a 20-inch water-pipe in Acushnet River in the city of New Bedford. Granted April 13, 1893.
1558. Petition of the town of Harwich for license to build bulk-heads and fill solid a portion of Lower Herring bridge on Herring River in said town. Granted April 13, 1893.
1559. Petition of the town of Harwich for license to build jetties at the mouth of Herring River in said town. Granted April 13, 1893.
1560. Petition of the towns of Harwich and Chatham for license to repair and fill solid a portion of Cove bridge on Muddy Cove in said towns. Granted April 20, 1893.
1561. Petition of the Boston & Maine Railroad for license to build an addition to the draw-pier of its Eastern Division bridge on Charles and Miller's Rivers in the city of Boston. Granted April 26, 1893.
1562. Petition of the Boston & Maine Railroad for license to drive additional piles in its Southern Division bridge on Charles River in the city of Cambridge. Granted April 26, 1893.
1563. Petition of the New Bedford, Martha's Vineyard and Nantucket Steamboat Company for license to build a pile wharf on Vineyard Sound in the town of Cottage City. Granted April 26, 1893.
1564. Petition of Eugene Battelle for license to build a pile pier and to maintain a float-stage in Mattapoisett harbor in the town of Mattapoisett. Granted April 26, 1893.
1565. Petition of the trustees under the will of Ebenezer Francis for license to fill solid a portion of a dock adjoining Francis wharf on Fort Point Channel in the city of Boston. Granted April 26, 1893.
1566. Petition of Alfred S. Hall and William O. Hall for license to build a culvert and tide-gate on Pines River in the town of Revere. Granted April 26, 1893.
1567. Petition of George W. Burr for license to widen his wharf, partly solid and partly on piles, and to dredge a channel in Hingham harbor in the town of Hingham. Granted April 26, 1893.

Nos.

1568. Petition of the Standard Oil Company of New York for license to widen its wharf, on piles, and to dredge in Chelsea Creek at East Boston. Granted May 4, 1893.
1569. Petition of the Boston & Maine Railroad for license to widen the road-bed of its Gloucester Branch Railroad by filling solid in tide water in the towns of Beverly and Manchester, and to build abutments, a draw-pier, and additions to the present draw-pier of its bridge in Manchester harbor in the town of Manchester. Granted May 10, 1893.
1570. Petition of Stephen M. Weld for license to build a dike and flume in Bourne's Cove in the town of Wareham. Granted May 10, 1893.
1571. Petition of the Provincetown Cold Storage Company for license to build a pile wharf in Provincetown harbor in the town of Provincetown. Granted May 10, 1893.
1572. Petition of Thomas B. Wales and others for license to build sea-walls fill, solid and extend their wharf on Fort Point Channel in the city of Boston. Granted May 17, 1893.
1573. Petition of Vaughn D. Bacon, Thomas C. Day and Eben B. Crocker for license to build a pile wharf and to maintain a float-stage in Barnstable harbor in the town of Barnstable. Granted May 17, 1893.
1574. Petition of William H. Friend for license to build a pile wharf and pier in Vincent Cove in the city of Gloucester. Granted May 17, 1893.
1575. Petition of Rogers Brothers for license to extend their wharf, on piles, in Boston harbor near the Reserved channel at South Boston. Granted May 23, 1893.
1576. Petition of the Martha's Vineyard Company for license to build a pile wharf on Vineyard Sound in the town of Tisbury. Granted May 23, 1893.
1577. Petition of the cities of Boston and Cambridge for license to repair a portion of the fender-guard of Canal or Cragie's Bridge on Charles River in the city of Cambridge. Granted May 24, 1893.
1578. Petition of John W. Churchill and others for license to build a dam and flume, and to excavate a canal near Darby Pond in the town of Plymouth, and to draw water from said pond. Granted May 24, 1893.
1579. Petition of the Boston & Maine Railroad for license to rebuild a portion of its wharf, on piles, between its Southern Division passenger bridge and its Southern Division

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- Nos.
- freight bridge on Charles River in the city of Cambridge, and to dredge in front of said wharf. Granted May 31, 1893.
1580. Petition of the Bowenville Coal Company for license to widen its wharf, partly solid and partly on piles, on Taunton River in the city of Fall River. Granted June 7, 1893.
1581. Petition of Johnson Brothers for license to build a pile structure in their dock in South Bay in the city of Boston, to drive additional piles within the lines of their wharf, and to fill solid a portion of said wharf. Granted June 20, 1893.
1582. Petition of Amelia B. Rowe for license to fill solid a portion of her wharf in South Bay in the city of Boston. Granted June 20, 1893.
1583. Petition of William H. Nickerson and others for approval of plans for an outlet from Herring Pond in the town of Eastham, as authorized by chapter 77 of the Acts of 1893. Granted June 26, 1893.
1584. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for an outfall sewer at Deer Island in Boston harbor, as authorized by chapter 439 of the Acts of 1889. Granted June 26, 1893.
1585. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for a pumping station, sewer and siphon on Mystic River near Malden bridge in the city of Boston, as authorized by chapter 439 of the Acts of 1889. Granted June 26, 1893.
1586. Petition of the city of Salem for license to rebuild a portion of the bridge on South River, at Union Street, in the city of Salem, and to widen the draw in said bridge. Granted June 27, 1893.
1587. Petition of the Boston & Maine Railroad for license to widen its wharf between its Eastern and Western Division bridges on Miller's River in the city of Boston, to rebuild a portion of said wharf, and to dredge. Granted June 29, 1893.
1588. Petition of the Cape Cod Bay Land Association for approval of plans for a bridge across Blackfish Creek in the town of Wellfleet, as authorized by chapter 132 of the Acts of 1893. Granted June 29, 1893.
1589. Petition of L. G. Burnham & Co. for license to build a pile structure in a dock on Fort Point Channel near Mount

Nos.

- Washington Avenue bridge, at South Boston. Granted June 29, 1893.
1590. Petition of Franklin P. Gurney and Edwin D. Gurney for license to build a sea-wall and bulkhead and to fill solid in Boston harbor at East Boston. Granted June 29, 1893.
1591. Petition of Lorenzo Richardson & Co. for license to fill solid and build a pile wharf on Chelsea Creek in the city of Chelsea. Granted July 12, 1893.
1592. Petition of the town of Milton for license to extend the easterly draw-pier of Granite bridge on Neponset River in said town. Granted July 18, 1893.
1593. Petition of the American Sugar Refining Company for license to build a sea-wall and fill solid on Fort Point Channel in the city of Boston. Granted July 19, 1893.
1594. Petition of the city of Boston for license to rebuild a portion of Dover Street bridge on Fort Point Channel in the city of Boston, as directed by a special commission appointed under chapter 428 of the Acts of 1890. Granted July 26, 1893.
1595. Petition of the Winnissimmett Company for license to extend a portion of its wharf, on piles, on Chelsea Creek in the city of Chelsea. Granted July 26, 1893.
1596. Petition of John Reed for license to extend his wharf by filling solid in Hull Bay in the town of Hull. Granted July 31, 1893.
1597. Petition of Horace H. Bigelow for license to build and maintain a pile foot-bridge in Lake Quinsigamond in the city of Worcester. Granted July 31, 1893.
1598. Petition of the Boston & Maine Railroad for license to build a stone abutment at the southerly end of Beverly bridge, to fill solid, and to rebuild a portion of said bridge, on Bass River in the city of Salem. Granted July 31, 1893.
1599. Petition of William F. Nye for license to extend his wharf, on piles, in New Bedford harbor, at Fish Island in the city of New Bedford. Granted Aug. 3, 1893.
1600. Petition of E. H. Noble & Co. for license to locate and maintain a float-stage in New Bedford harbor, near Fort Phoenix in the town of Fairhaven. Granted Aug. 3, 1893.
1601. Petition of the Old Colony Railroad Company for license to build an abutment and retaining walls at the westerly end of Dover Street bridge, on Fort Point Channel in

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- Nos.
- the city of Boston, and to build a stone pier and fill solid at and near the easterly end of said bridge, as directed by a special commission appointed under chapter 428 of the Acts of 1890. Granted Aug. 3, 1893.
1602. Petition of George M. Smith for license to extend his wharf, on piles, on Charles River in the city of Cambridge. Granted Aug. 8, 1893.
1603. Petition of Ann M. White for license to build and maintain a solid filled wharf in Marblehead harbor in the town of Marblehead. Granted Aug. 8, 1893.
1604. Petition of Mrs. Lamont G. Burnham for license to build a wharf on stone and timber piers on Essex River, at Long Island in the town of Essex. Granted Aug. 11, 1893.
1605. Petition of the Boston & Maine Railroad for license to build a stone abutment at its bridge in Manchester harbor in the town of Manchester, to build a new draw-pier to said bridge, to build an addition to the present draw-pier of said bridge, and to fill solid. Granted Aug. 11, 1893.
1606. Petition of Sarah H. Stratton for license to fill solid a portion of her wharf on Fort Point Channel in the city of Boston. Granted Sept. 8, 1893.
1607. Petition of the Quinsigamond Lake Steamboat Company for license to build and maintain a wharf in Lake Quinsigamond in the town of Shrewsbury. Granted Sept. 19, 1893.
1608. Petition of the town of Plymouth for license to lay a sewer-pipe in Plymouth harbor in the town of Plymouth. Granted Sept. 19, 1893.
1609. Petition of Patrick Meehan for license to build and maintain a pile wharf in Buzzard's Bay in the town of Falmouth. Granted Sept. 19, 1893.
1610. Petition of the Board of County Commissioners of Bristol County for approval of plans for a bridge across the East Branch of Westport River in the town of Westport, as authorized and required by chapter 125 of the Acts of 1893. Granted Sept. 26, 1893.
1611. Petition of Isaiah Spindell for license to widen a portion of Bar Neck wharf, on piles, in Wood's Holl Great harbor in the town of Falmouth. Granted Sept. 26, 1893.
1612. Petition of George Parker for license to build a pile wharf in Boston harbor at East Boston. Granted Oct. 3, 1893.

Nos.

1613. Petition of the West End Street Railway Company for license to widen a portion of its wharf, on piles, in South Bay in the city of Boston. Granted Oct. 8, 1893.
1614. Petition of the Board of County Commissioners of Essex County for approval of plans for a foot-bridge across the Merrimac River adjoining the Boston & Maine Railroad Bridge in the city of Haverhill and town of Bradford, as authorized and required by chapters 244 and 453 of the Acts of 1893. Granted Oct. 3, 1893.
1615. Petition of Joseph Hellen for license to build a sea-wall and fill solid on Mystic River in the city of Medford. Granted Oct. 10, 1893.
1616. Petition of Mrs. Mary A. Harvey for license to build and maintain a wharf and float-stage on Weymouth Fore River in the city of Quincy. Granted Oct. 20, 1893.
1617. Petition of the city of Boston for license to dump snow and ice into tide waters in and around the cities of Boston, Cambridge and Chelsea. Granted Nov. 28, 1893.
1618. Petition of the West End Street Railway Company for license to dump snow and ice from certain bridges into tide waters. Granted Nov. 28, 1893.
1619. Petition of the town of Manchester for license to build a sea-wall and fill solid in Manchester harbor in said town. Granted Nov. 28, 1893.
1620. Petition of William C. Norcross for license to build a pile wharf in South Bay in the city of Boston. Granted Nov. 28, 1893.

Of the foregoing licenses, Nos. 1565, 1572, 1591, 1606 and 1615 were granted to authorize solid filling, extending beyond the bulkhead lines approved by the Secretary of War. Nos. 1532, 1549, 1594 and 1601 authorized structures extending beyond the pierhead line approved by the Secretary of War. These licenses were made subject to the laws of the United States in respect to harbor lines, and in order to give them validity the approval of the Secretary of War was necessary.

APPLICATIONS FOR LICENSES REFUSED OR WITHDRAWN.

Filed on Dec. 22, 1892, petition of John C. Haynes, George W. Parke and William G. Fish, Trustees, for license to build two piers in Buzzard's Bay, in the town of Falmouth. Hearings given on Jan. 12 and 26, 1893. It appeared that the piers, if constructed,

would substantially surround the shore of certain land belonging to Mr. Patrick Meehan, who objected to the granting of the license. The Board were unwilling to grant the license applied for without the consent of the owners of all the land to be enclosed by the proposed structures. The petitioners, at their request, were given leave to withdraw.

Filed on Jan. 5, 1893, petition of the American Linen Company for license to extend its wharf on Taunton River, in the city of Fall River. Hearings were given on Jan. 19 and Feb. 9, 1893. The Board also visited the wharf which it was desired to extend. They were satisfied that the proposed structure could not be built without injury to the dock of the Fall River Iron Works Company, the adjoining proprietor, which opposed the granting of the license. On Feb. 9, 1893, the Board finally considered the matter and dismissed the petition.

Filed on March 9, 1893, petition of Walter W. Hodgkins for license to build a wharf in Lake Quinsigamond, in the city of Worcester. Hearing given on March 30, 1893. The city of Worcester appeared and opposed the granting of the license on the ground that the contemplated use of the proposed structure would interfere with the safe and convenient use of the causeway across Lake Quinsigamond. The petition was dismissed.

Filed on May 31, 1893, petition of C. Walter Hall and others to excavate an outlet to Slough Pond, in the town of Brewster. Hearings were given on June 13 and July 25, 1893. Mr. Jeremiah Walker, through whose land runs the outlet which the petitioners desired to excavate, opposed the granting of the license, and the Board refused to grant the license without his consent.

Filed on April 30, 1891, petition of Henry S. Barnes for license to build a pile wharf at Gibbs' Narrows, in the town of Bourne. Hearing was given May 14, 1891. The case had been pending for a long time, and, after notice to the petitioner, on Feb. 16, 1893, the petition was dismissed.

MISCELLANEOUS PERMITS.

In addition to the licenses already mentioned as granted by the Board during the period covered by this report, there were also granted twenty miscellaneous permits for other purposes, such as for dredging, for dumping material at certain places under proper restrictions, for taking gravel or sand from certain beaches for certain purposes, to lay a pipe

under a beach and projecting into tide water, to excavate a berth at the end of a certain wharf, and for authorizing the publication of a certain notice in the name of the Board.

TIDE-WATER ASSESSMENTS AND THE BOSTON HARBOR COMPENSATION FUND.

From tide-water assessments under licenses granted by the Board there was paid into the treasury of the Commonwealth during the eleven months ending Nov. 30, 1893, the sum of \$5,605.69. These assessments were all made in Boston Harbor, and the money is accordingly reserved, under the provisions of section 14 of chapter 19 of the Public Statutes, as part of the compensation fund, the income of which may be used and expended from time to time under the direction of the Board for the improvement of that harbor. The Board has received various requests for the application of portions of the income of this fund for certain local improvements which are required in different parts of Boston Harbor, and they have now under consideration, as work which they might be able to do by means of the income from the fund, certain dredging in the Neponset River, and the removal of certain shoals in South Bay and Charles River, the surveys for which have already been mentioned. Any work thus done by the Board will be undertaken only after conference with Lieutenant Colonel Mansfield, who is in charge of the work done by the United States in the harbors in the eastern district of Massachusetts. The United States Government assumes charge of all harbor improvements which are required for the purposes of international and interstate commerce. The intention of the Board is to apply the income of the harbor compensation fund to improvements which are essentially local and which the United States Government might not think it worth while to undertake.

RECEIPTS FROM GRANTS OF PUBLIC LANDS.

The amount received during the eleven months ending Nov. 30, 1893, for grants of rights and privileges in lands of the Commonwealth under licenses from this Board for filling and for the erection of wharves and other structures

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in and over tide waters and great ponds is \$83,436.93. Other like assessments to the amount of \$5,032.50 have been made during the same period, for which the money has not yet been paid into the treasury. Payment for such grants was first required by chapter 284 of the Acts of 1874, now section 16 of chapter 19 of the Public Statutes. Since the passage of that act the total amount so received and paid into the treasury of the Commonwealth is \$372,639.33.

In addition to the payments above named, \$50 was paid as rent for Hangman's Island.

The amounts received from leases of the Commonwealth's lands at the South Boston Flats and paid into the Commonwealth's Flats Improvement Fund was \$2,259.94, as already stated in the portion of this report relating to that subject.

LEASE OF HANGMAN'S ISLAND.

Hangman's Island is situated within the tide-water limits of the city of Quincy and is subject to the jurisdiction of that city, but, having no other ownership, belongs to the Commonwealth, and on Jan. 1, 1890, this Board gave a lease of the island to certain fishermen who were occupying it. This lease terminated on Jan. 1, 1893, and on application of the fishermen the Board authorized and executed a new lease running three years from Jan. 1, 1893, at the rent of \$50 a year, payable on the 1st of July in each year. The former lease was made to S. Albert Freeman of Boston as trustee. Mr. Freeman has now withdrawn from that position, and the new lease is made to Lawrence Hagan, one of the fishermen, who lives on the island, as trustee for himself and five others. Otherwise the terms of the new lease are the same as those of the former lease, which is printed in the appendix to the report of this Board for the year 1890.

THE PROVINCE LANDS.

Chapter 470 of the Acts of 1893 provides that the Board of Harbor and Land Commissioners shall have general care and jurisdiction of so much of the Province Lands at Provincetown as lie north and west of the line described in the said act. Said act further provides that—

The said commissioners shall fix and mark the bounds of the province lands within their jurisdiction, and shall establish regulations for the care thereof, shall annually appoint a superintendent thereof, and with the approval of the governor and council shall fix the amount of his salary and the amount which may be expended by him in the protection and improvement of said land.

Further provisions of the act release that portion of the Province Lands lying east and south of the line fixed thereunder from the claims hitherto asserted by the Province and the Commonwealth to ownership of the said lands in fee, and, as to said released portion of said lands, repeal the clause excepting the Province Lands from the provisions of the Public Statutes permitting a title to lands to be acquired against the Commonwealth by twenty years' adverse possession.

The effect of the statute is that private ownership remains impossible in the reserved portion of the Province Lands lying north and west of the line established and that all of the lands in this portion belong in fee to the Commonwealth and can be used and occupied only by its permission, and subject to such regulations as this Board shall from time to time establish. Said reserved portion, although belonging to the Commonwealth, forms a part of the township of Provincetown, as incorporated by chapter 11 of the Province Laws of 1727, and is subject to its jurisdiction. The released portion of the said lands is about 955 acres and includes the whole inhabited part of the town of Provincetown, there being about 5,000 inhabitants.

The Commissioners, as directed by the said act of 1893, have fixed and marked the bounds of the Province Lands within their jurisdiction, and annex to this report as a part thereof a map on which said bounds are designated by courses and distances.

The Commissioners have appointed as superintendent of the Province Lands for the half year ending July 1, 1894, Mr. James A. Small of Provincetown, and with the approval of the Governor and Council have fixed his salary at the rate of \$600 a year.

The Commissioners have, since the passage of the act, per-

sonally visited and inspected the Province Lands, and have given much time to the consideration of the question of what and how much work is required for their preservation, protection and improvement. It is too early yet to have matured any final plan. The principal work immediately in contemplation is the planting of trees or bushes and of beach grass and probably Scotch broom, with the aim of restraining, and so far as possible preventing, the drifting of the loose sands. These sands at present are swept by the winds over woodlands and ponds, burying everything before them, and are advancing slowly but surely towards the town of Provincetown and its harbor. It is also proposed to construct a road leading from the town of Provincetown into the Province Lands. The location of this road has not yet been definitely decided upon. It will have to be fixed after consultation with the town authorities, inasmuch as it will be necessary for the town to construct a road to connect with the Commonwealth's road at the boundary line.

The tract now designated as the Province Lands was purchased from the Indians in behalf of the Government and Colony of New Plymouth. The first deed of the lands was given by an Indian named Sampson to Thomas Prence in 1654 "or sometime before that date" "for the said Colonies use," the consideration being "2 brasse kettles six coates twelve houes 12 axes 12 knives and a box." Said lands were "assigned for the Collonies use for ffishing Improve-ments." Twenty-five years later, on February 5, 1679, another and confirmatory deed of these lands was given by the said Indian Sampson and two other Indians named respectively Peter and Joshua. This last deed recited the facts just stated in regard to the deed of Sampson to Thomas Prence and also set forth that since the making of the first deed it had appeared that the Indians Peter and Joshua claimed part of the said lands, and that therefore the new deed was given, executed by all three, a consideration of five pounds and ten shillings being paid to Peter and Joshua in addition to the consideration already mentioned which was paid to Sampson at the time he gave the first deed. The confirmatory deed was made to John Freeman, who was at

that time one of the Assistants of the Colony, “in behalf of the Government and Collonie of New Plymouth aforesaid.”


The first deed of Sampson to Thomas Prence is not in existence, and no record of it has been found. The following is printed from a certified copy of the confirmatory deed of 1679, as recorded in the Plymouth Colony Records, Vol. IV. of Deeds, pages 318, 319. The original deed, of which a fac-simile is inserted in this report, is preserved in the office of the Secretary of the Commonwealth:—


Windslow, Courr.


This Indenture made the fift day of february Ann^o Dom one thousand six hundred seaventy and nine between Samsson Indian of Pottonumalutt . . . Peter Indian of Paornett and Joshua Indian of Paornett aforesaid in the Collonie of New Plymouth of the one pt and Capt. John ffreeman of Eastham in the Collonie of New Plymouth aforesaid Esquir in behalf of the Gouverment and Collonie of New Plymouth aforesaid of the other pt Witnesseth that whereas the said Samsson did in the year of our Lord one thousand six hundred fifty and four or sometime before that date bargainne sell and enfeofe unto the honored Thomas Prince Esqr. Late Gouver of the said Collonie, for the said Collonies use their heires successors and assignes forever all that his prsell of land lying and being upon Cape Codd beginning att the point of land comonly called the house point on the southerly syde of the harbour comonly called Cape Codd harbour; extending westerly as farr as the creek comonly known there by the name of Lovells Creek together with all the beaches fflatts waters proffitts priviledges and appurtenances to the said bargained prmises belonging or any wise appertaining from sea to sea on both sides of the said bargained prsell of land: and alsoe all his said right title and interest into any of the lands, from the said Lovells Creek extending round the said harbour; easterly untill it comes to a little pond next the easteren harbour being about two or three miles as is supposed, short of the said easteren harbour: and by a southerly line from the said little pond to the said Cape Codd harbour near against the eastermost point of the said house point of land: and from the said pond northerly to the back sea; which containes the bounds sett by the said Gouver Prence; and assigned for the said Collonies use for fflishing Improvements: for and in consideration of 2 brasse kettles six coates twelve houes 12 axes 12 knives and a box by the said Gouver Prence to the said Samsson in hand payed, the receipt whereof the said Samsson doeth hereby acknowledge; and himself therewith

fully satisfied contented and payed; and thereof doth acquitt and discharge the said Gouver Prence and Collonie their heires successors and assignes foreuer and by these presents doth fully freely and absolutely convey infeoffe and confirm unto the said John freeman in behalf of the said Gouverment and Collonie of New Plymouth, their heires successors and assignes forever: all the said bargained prsell of land with other the said bargained premises and appurtenances; To have and to hold to the onely proper use and behoof of the said Gouverment and Collonie; their heires successors and assignes foreuer; and further witnesseth these presents that altho att the time of the said Gouver Prence his said purchase of the said Samsson and his possession taken of the lands bounded as above mentioned for the Collonies use as aforesaid on the said Gouvernors inquiring of Mr John and of other old Indians; there appeared noe other Indians but the said Samsson to lay claime to any of the said lands: yett it since appeering that the above mentioned Peter and Joshua Indians claime prt of the said lands: viz: from the said Lovells Creek, to the said Little pond crosse the Neck to both seas as aforesaid by virtue of a graunt and purchase from John . . . Suason by consent and order from his father Mattagoason Sachem whose right it was as appeers by the testimony of sundry old Indians, the Gouverment aforesaid being willing to doe noe wronge to the Indians whose right appeers and for maintaining peace and good agreement between the Indians and the English are content fairely to obtaine by due satisfaction made to the Indians for what land they haue witnesseth therefore these presents; that the said Peter and Joshua Indians for and in consideration of five pounds and ten shillings to them in hand payed by the said John freeman in the behalfe of the said Gouverment and Collonie the receipt whereof the said Peter and Joshua doe hereby acknowledge and themselves therewith fully satisfied contented and payed and thereof and of every prt and prsell thereof doe exonnarate acquitt and discharge the said John freeman Gouvernment and Collonie their heires successors and assignes for euer by these presents; have freely and absolutely given graunted bargained sold enfeofed and confirmed; and by these presents doe give graunt bargain sell infeoffe and confirme, unto him the said John freeman the Gouverment and Collonie of New Plymouth their heires successors and assignes foreuer by these presents all those our Lands att Cape Codd lying between sea and sea, from the said Lovells Creek: unto the said Little pond called by the Indians . . . Weak-wolthtagesett ranging from thence by a marked pyne tree southerly by a smale Red oak tree marked standing on on the easterly end of the clift called by the Indians Letistotogsett because Cormorants

use there to Roost and thence to the sea being neare over against the easteren end of the aboue mensioned Land called the house point together with all the beaches flatts waters proffitts priviledges and appurtenances to the said bargained lands belonging or any way appertaining excepting alwayes reserved to the use of the said Peter and Joshua theire and euery of their heires and assignes foreuer libertie to sett their Wigwams on the said Lands and to cut firewood and beach Grasse and flages for their use and to Gather wild pease huckleberrys and cramberries and to have such whales Blackfish porpusses and blubber as shall cast on shore between the said Louells Creek and the Clift aforesaid. To haue and to hold all the said Lands and other the said bargained premises with their appurtenances unto the said John ffreeman Gouverment and Collonie of New Plymouth aforesaid their heires successors and assignes foreuer unto the onely proper use and behoof of them the said John ffreeman . . . Gouverment and Collonie aforesaid their heires successors and assignes for euer except as before excepted to be reserved, and they the said Samsson Peter and Joshua for themselves and each of them for his heires and assignes; all the said bargained lands premises and appurtenances to the said John ffreeman Gouverment and Collonie for and to the onely proper use and behoof of the said Collonie in Manor and forme aforesaid; except as before excepted, against them the said Samsson, Peter and Joshua theire and euery of their heires and assignes shall warrant and foreuer defend by these prsents. In Witness whereof the prties to these prsents have hereunto enterchangable sett their handes and seales the date aboue written.

SAMSSONS MARK  (seal)

PETERS  MARK (seal)

JOSHUA HIS  MARK (seal)

Signed sealed and delivered in prsence of

William ffreeman

John Sias

John Suason *D* his mark

Will: Abstomls + his Mark.

The within and aboue mensioned Samsson
Peter and Joshua appeered the date
abouesaid and acknowledged these prsents
to be their act and deed

Before me THOMAS HINCKLEY *Assistant*.

PLYMOUTH, MASS., Dec. 18, 1893.

The above is a true copy from Plymouth Colony Records, Vol. IV. of Deeds, pages 318, 319.

Attest:

WM. S. DANFORTH, *Reg.*

In 1691 the Colony of New Plymouth was made a part of the Province of Massachusetts Bay and these lands thenceforth were called the "Province Lands."

The scenery of the Province Lands is exceedingly unique and interesting, consisting of irregular hills, ridges, dunes and beaches of sand, with a number of shallow ponds and thickets of scrub growth, containing many trees of fair size, among them pines, oaks and maples. The whole tract is a wilderness of about 3,290 acres, bounded by the Atlantic ocean on the north and west.

Some persons have had the idea that the Province Lands could be made into a species of park for the people of the Commonwealth, and no doubt, if enough money were spent, it could be made a very beautiful place for summer recreation, differing in character from any park in the world, the color effects of the sand, water and foliage being most picturesque and attractive. It is, however, distant from any centre of population, and the expenditure of money by the Commonwealth for the purpose of turning the Province Lands into a pleasure ground would be a departure from precedent which this Board would not take the responsibility of recommending until practically assured of the success of the experiment. At present it is unnecessary to determine what the ultimate use of the Province Lands shall be, the efforts of the Commissioners being directed simply to preventing the shifting sands from doing injury and to making the Province Lands in their present state reasonably accessible from the town of Provincetown.

By chapter 480 of the Acts of 1893 there was appropriated for the purpose of providing for the care and supervision of the Province Lands a sum not exceeding \$2,000. There has been expended out of this appropriation the sum of \$610.86. This was used in paying the expenses of the surveys made under the engineer of this Board and for the making and placing of monuments marking the bounds, and also includes travelling expenses, but nothing for the salary of the superintendent, as his term does not begin until the 1st of January, 1894. The Commissioners estimate that to provide for the care and supervision of the Province Lands during the year 1894, including the salary of the superintendent and the ex-

penditures necessary for procuring and planting trees, grass and broom, and building some portion of the proposed road, an appropriation of \$3,500 will be required.

BOUNDARY ON TIDE WATER BETWEEN THE TOWNS OF
MASHPEE AND BARNSTABLE.

Chapter 105 of the Resolves of 1893 directed the Board of Harbor and Land Commissioners to examine and define the boundary line on tide water between the towns of Mashpee and Barnstable and report thereon to the next General Court. The Board gave a hearing upon this matter at Cotuit on May 16, 1893, and their engineer during the following summer made a careful survey of Popponessett Bay, with soundings showing the existing channels. Copies of the plan made by the engineer of the Board were sent to the counsel for the towns of Mashpee and Barnstable, and on October 25, another hearing was given at Cotuit. At both of the hearings the towns were represented by counsel and a number of witnesses on both sides examined. The testimony given at the hearings related principally to the question of where the channel of Popponessett Bay was in 1858, when the selectmen of the two towns made a perambulation defining the boundary line on tide water between the two towns as running by the middle of the Santuit river "to the channel of Popponessett Harbor, and by said channel to the Vineyard Sound." Subsequent investigation satisfied the Commissioners that the perambulation of 1858 was inaccurate, and that the selectmen who signed the report had no authority for the declaration that the boundary through Popponessett Bay ran by the channel.

The Commissioners find that the boundary line which they are called on to examine and define was established in January, 1795. By a resolve passed on March 26, 1793, the Legislature appointed George Partridge of Duxbury, Samuel Smith of Dartmouth and Nathaniel Hammond of Rochester to perambulate and settle the true boundary lines between the lands of the Mashpee Indians and the proprietors of the town of Barnstable. The resolve terminated as follows:—

The doings of the said Committee certified under their hands to this Court and accepted & recorded in the Office of the Register of deeds of the County where such lands lay to be definitive and conclusive between the parties.

By a subsequent resolve, passed on Jan. 22, 1794, Samuel Smith having died, Isaac Thompson was appointed in his stead and authorized, in conjunction with George Partridge and Samuel Hammond, to do and perform all the business designated in the resolve of 1793.

By a third resolve passed on Jan. 22, 1795, the report of Partridge, Thompson and Hammond, dated Oct. 7, 1794, was accepted by the Legislature. A copy of said three resolves, certified by the Secretary of the Commonwealth, is printed in the appendix to this report. [See Appendix E.] The first resolve was approved as Governor by John Hancock, and the last two by Samuel Adams.

The portion of the said report relating to the boundary between the towns on tide water is as follows:—

—thence West twenty nine degrees south thirty Rods to a brook or River called Somtuite alias Contuite River a little below a pond called Somtuite alias Contuite pond—thence down stream by the middle of said River to paupanesset bay—thence by said Bay to the sea—leaving two Islands—of salt marsh or flats called Thatch Islands lying in said bay to appertain and belong to the district of Mashpee—

On June 26, 1794, the Legislature passed a resolve requiring the inhabitants of the several towns and districts in the Commonwealth to cause to be taken by their selectmen or some other suitable persons accurate plans of their respective towns and to lodge the same in the Secretary's office.

By another resolve passed on June 25, 1795, the overseers of the district of Marshpee were authorized to cause an accurate plan of said district to be taken at the expense of the Commonwealth, in accordance with the resolve of June 26, 1794.

Under these Resolves the town of Barnstable and the district of Mashpee both filed plans. The plan of Mashpee does not carry the boundary line into the tide water, but it

has the following indorsement upon it: "The Line Between Barnstable and Marshpee was Settled by a Committee from General Court in 1793."

The plan filed by Barnstable was made by Samuel Bassett in May, 1795. It represents the boundary in Popponessett Bay as made up of a series of straight lines connecting at angles, running through the bay to the sea.

On March 1, 1830, the Legislature passed another resolve similar to the one of 1794, requiring all towns to make surveys of their territory and return plans of the same into the Secretary's office. Under this Resolve also both Barnstable and Mashpee filed plans. The plan of Barnstable does not carry the line into tide water, but that of Mashpee, which is thereon called "Marshpee," designates the boundary on tide water by a dotted line running through Popponessett Bay to the sea. It is evident that neither the Barnstable map filed under the resolve of 1794 nor the Mashpee map filed under the resolve of 1830 was founded on any actual survey of the coast line, the shore in both cases being indicated by an irregular wavy line, which has very little resemblance to its actual contour. But both of these maps make it plain that the boundary line through Popponessett Bay to the sea did not run by the channel.

Perambulations by the selectmen of the two towns are recorded for the years 1826, 1838, 1848, 1853, 1858, 1865, 1871, 1876, 1881, 1885 and 1890. In all of these perambulations except that of 1858, which has already been mentioned, the descriptions substantially follow the language of the establishment of the line by Partridge, Thompson and Hammond under the resolve of 1793, and describe the boundary as running through or by the said bay to the sea, making no mention of the channel.

In response to the above named resolve of 1893, this Board respectfully submits to the Legislature the map which accompanies this report, and recommends the establishment by statute of the boundary line on tide water between the towns of Mashpee and Barnstable thereon designated. The Commissioners believe that the line which they recommend is in accordance with the boundary line originally established by Partridge, Thompson and Hammond and accepted by the

General Court in 1795. The line resembles in character and in general direction that laid down upon the Barnstable map filed under the resolve of 1794, and is consistent with the general direction of the line indicated on the Mashpee map filed under the resolve of 1830, although the coast line on this last-named map is so wholly imaginary that no important conclusion can be drawn from it.

The boundary line recommended is composed of a series of straight lines, laid out in such a way that they can be easily designated by monuments placed on the mainland and on Gooseberry, Popponessett, Little Thatch and Big Thatch islands. The board recommend that, if the Legislature see fit to establish the line designated by them, the act establishing it shall provide for its being marked by suitable monuments.

WORK OF THE UNITED STATES IN HARBORS OF THE
COMMONWEALTH.

Lieut. Col. Samuel M. Mansfield of the Corps of Engineers, U. S. A., who is in charge of the harbors of the Eastern District of Massachusetts in behalf of the United States, and Capt. William H. Bixby of the Corps of Engineers, U. S. A., who is similarly in charge of the harbors of the Southern District, have continued to give to the Board their cordial co-operation and assistance. We have the privilege of appending to this report statements made by these officers of the work respectively accomplished by them during the year in the harbors of this Commonwealth, being abstracts from their own annual reports kindly made by them at the request of this Board.

The foregoing report is respectfully submitted by

HENRY W. SWIFT,
JOHN I. BAKER,
CHARLES H. HOWLAND,
Commissioners.

BOSTON, Dec. 1, 1893.

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STATEMENT

OF

LIEUT. COL. S. M. MANSFIELD, CORPS OF ENGINEERS, U. S. A.

[Referred to in the foregoing Report of the Board.]

Nov. 29, 1893.

The Board of Harbor and Land Commissioners of Massachusetts :

GENTLEMEN : — In accordance with your request of Nov. 27, 1893, I have the honor to furnish the following summary of the work done by the government during the year 1893, in those rivers and harbors of Massachusetts which are under my charge :

1. Newburyport Harbor.

The project for the improvement of this harbor has not been changed.

No work has been done during the year on the south jetty or Plum Island dike.

Under the contract with Mr. George Willett Andrews, 11,359 tons of rubble-stone were deposited in the north jetty during the year, and 2,700 feet of the jetty are now essentially completed. Operations under this contract were suspended for the season in Nov. 1893, and will be resumed about May 1, 1894.

The annual survey of the bar was made in May, 1893. It showed that there was $13\frac{6}{10}$ feet on the bar, and that the 13 foot channel across the bar was at least 300 feet wide.

2. Harbor of Refuge, Sandy Bay.

No change in the project was made during the year.

During the year under the contract with the Rockport and Pigeon Hill Granite companies, 82,000 tons of rubble-stone were deposited in the breakwater below mean low water, and 5,000 tons above low water. 300 feet of the breakwater are completed.

3. *Gloucester Harbor.*

The project for the improvement of the harbor remains unchanged.

During the year 83,719 cubic yards were dredged from Harbor Cove and the main harbor, under a contract with the National Dredging Company, and the improvement so far as dredging is concerned is completed.

Some small ledges uncovered by the dredging will be removed early next year.

No work has been done on the proposed breakwater at Eastern Point.

4. *Manchester Harbor.*

No change has been made in the project.

Under the contract with Mr. Edgar P. Lovering dredging was commenced during the latter part of Oct. 1893, but as only about 2,000 cubic yards have been dredged, no appreciable change in the improvement has been effected during the year.

5. *Salem Harbor.*

No change has been made in the project for the improvement of this harbor.

No work was done under the contract with Mr. Augustus R. Wright to dredge 40,000 cubic yards; but under the contract it is expected that the improvement will be completed during the coming year.

6. *Lynn Harbor.*

The project for this improvement remains unaltered.

Under the contract with Messrs. Boynton Bros. 39,808 cubic yards were dredged from the Western or Saugus River channel and the inner channel.

The entrance to the Saugus River channel is now 150 feet wide, 8 feet deep at mean low water.

7. *Winthrop Harbor.*

The project for the improvement of this harbor was completed under a contract with Mr. O. E. Lewis.

8. *Boston Harbor.*

No change was made during the year in the project for the improvement of this harbor.

During the year the improvement of the channel leading to Jeffrey's Point was completed. The channel is now 400 feet wide

from Grand Junction wharf to just east of Simpson's Patent Dry Docks, and 18 feet deep at mean low water; thence, it gradually narrows to 250 feet, and the depth decreases to 15 feet at mean low water to near Jeffrey's Point.

The dredging in the Nantasket Beach Channel was completed. The channel is now 12 feet deep at mean low water, except over the ledge near the steamboat wharf.

Under the contract with Mr. Charles H. Souther and Mr. Augustus R. Wright for the improvement of the main ship channel, during the year, 176,783 cubic yards were dredged, principally from the shoal off False Spit beacon, although some dredging has been done on the shoal off Boston Light, and from Brewster Spit.

9. *Hingham Harbor.*

The project for the improvement of this harbor was completed during the year by the removal of the ledge between Chandler's and Ragged islands, under a contract with Mr. George W. Townsend.

10. *Scituate Harbor.*

About 300 running feet of the south breakwater were built under the contract with Mr. Joseph H. White, of which 150 feet were built during the year.

No other change has occurred.

11. *Plymouth Harbor.*

The project for the improvement of this harbor was completed during the year under a contract with the National Dredging Company.

About 1,400 running feet of bulkheads protecting Long Beach were repaired.

12. *Kingston Harbor.*

The project for the improvement of this harbor was completed during the year, under a contract with the National Dredging Company. The channel to the Cordage Company wharf is 100 feet wide, 6 feet deep at mean low water.

13. *Wellfleet Harbor.*

No change has been made in the project, and no work has been done.

14. *Provincetown Harbor.*

No repairs or extensions of the works protecting this harbor have been made.

15. Chatham Harbor.

No change was made in the project and no work was done.

16. Essex River.

The project for the improvement of this river proposes to widen and deepen the natural channel of the river, for a distance of 12,000 feet, so that 4 feet at mean low water can be carried to the head of navigation, in a channel 60 feet wide.

No work was done during the year.

17. Merrimac River.

The project for the improvement of this river was completed during the year, by the removal of the "Boilers" to the depth of 5 feet at mean low water, under a contract with Messrs. Sturgis & Andrews.

18. Powow River.

No change has occurred in this improvement.

19. Ipswich River.

No work has been done under the contract with Mr. Edgar P. Lovering, by which it is expected to complete the improvement.

20. Weymouth River.

Nothing was done during the year.

21. Mystic River.

Nothing was done during the year.

22. Malden River.

Nothing was done during the year.

23. Removal of Wrecks.

A contract was entered into with Mr. D. A. Johnston to remove the wreck of the schooner "Wildfire" from Provincetown Harbor.

Operations were commenced under this contract in Nov. 1893, and will be completed next month.

An advertisement was issued inviting proposals for the removal of three unknown wrecks lying off Chatham.

Very respectfully, your obedient servant,

S. M. MANSFIELD,
Lieutenant Colonel of Engineers.

STATEMENT

or

CAPT. W. H. BIXBY, CORPS OF ENGINEERS, U. S. A.

[Referred to in the foregoing Report of the Board.]

Abstract of work of River and Harbor Improvement done in the State of Massachusetts by the U. S. Government, under direction of Capt. Wm. H. Bixby, Corps of Engineers, for the fiscal year ending June 30th, 1893, with brief notes as to subsequent work up to November 30th, 1893.

Taunton River, Mass.

The approved project of 1880, as modified in 1888, provides : — for the widening and deepening of the river so as to secure a channel of at least 12 feet depth at high water with 100 feet width from its mouth up to Berkley Bridge (above Dighton) ; thence 12 feet depth with 80 feet width (100 feet width at bends) up to Briggs Shoal ; thence 11 feet depth with 80 feet width up to the Ship Yard ; thence 11 feet depth with 60 feet width up to Weir Bridge, Taunton ; all at a total cost estimated in 1893 at \$125,000, of which \$108,000 has been appropriated up to June 30th, 1893, leaving \$17,000 still to be appropriated to complete the improvement as projected.

A plan of the works may be found at page 606, Annual Report of the Chief of Engineers for 1884 ; and a later more detailed plan in House Ex. Doc., No. 86, of the 50th Congress, 1st Session ; and further information at page 373 of the Annual Report of 1880 ; page 519 of 1888 ; and page 822, report of 1893.

At the adoption of the present project, the channel was limited to 9 feet at high water and was too narrow, and too much obstructed by boulders for easy navigation by the craft making use of it.

48 HARBOR AND LAND COMMISSIONERS. [Jan.

During the last fiscal year work was carried on at the Needles, Briggs Shoal, the reach below 3-mile River, and at Burt's Turn. About 5,050 yards of clay, sand and gravel have been dredged and 168 tons of boulders removed. Work on this river was stopped November 29th, 1892, since which time no further field work has been undertaken up to November 30th, 1893.

As a result of all work up to November 30th, 1893, almost all of the proposed project has been completed; especially at the places most complained of by the vessels using this river.

There was on November 30th, 1893, only \$3.35 available for the continuance of work.

Further work awaits further appropriations.

Hyannis Harbor.

The approved project of 1884, provides:— for the dredging to 15.5 feet depth at low water, of about 34 acres of shoal area north of the existing breakwater, so as to increase the deep water harborage by that amount; all at a total cost estimated in 1884 at \$46,743.20 (including \$81.20 left over from a former project,) of which \$34,081.20 has been appropriated up to June 30th, 1893, leaving \$12,662, still to be appropriated to complete the improvement as projected.

A plan of the works may be found at page 560, Annual Report of the Chief of Engineers for 1885; and further information at page 621 of 1885, and page 804 of 1893.

At the adoption of the present project, the 15.5 feet depth anchorage covered only about 47 acres, and the 34 additional acres to be dredged carried an average of about 12 feet depth of water at low water.

During the last fiscal year comparatively little work has been done except to enter into Contracts for the next season's work. No further work has been done up to November 30th, 1893, owing to unavoidable delays of the Contractor.

As a result of all work up to November 30th, 1893, 12 acres, out of 34, have been dredged.

There was on November 30th, 1893, a balance unexpended of \$5,124.81 available for the continuance of this work.

Contract work will be probably commenced and finished before May, 1894; after which further work will await further appropriations.

Nantucket Harbor.

The approved project of 1880, as modified in 1885, provides:— for the construction of two jetties, as training walls, one on each

side of the harbor entrance, planned so as to allow the tidal current to assist in scouring out and maintaining a good channel; and for the completion of the work by dredging where necessary to obtain a depth of 15 feet at low water in this channel; all at a total cost estimated in 1885 at \$375,000, of which \$195,000, has been appropriated up to June 30th, 1893, leaving \$180,000 still to be appropriated to complete the improvement as projected.

A plan of the works may be found at page 578, Annual Report of the Chief of Engineers for 1885, and at page 806, report of 1893.

At the adoption of the present project, no jetties existed; and the channel entrance was barred by a shoal of 1.5 miles width, on which there was only 6 feet depth of water at low tide.

During the last fiscal year preparations were made for the continuance of field work. Since then no further important field work has been done. The channel is found to be deepening and moving to the eastward.

As a result of all work up to November 30th, 1893, the west jetty has been built to 3,955 feet length with full height; the east jetty has been built to 834 feet length with full height; then comes a gap of 160 feet, and then 1,300 feet length raised to half tide level.

There was on November 30th, 1893, a balance of \$21,061.41 available for the continuance of work.

Work on this improvement will probably be commenced and finished early in the working season of 1894, after which further work will await further appropriations.

Edgartown Harbor.

The approved project of 1889, provides:—for the removal to 10 feet depth, at low water, of a “middle ground” shoal in the central part of the inner harbor; all at a total cost estimated in 1893 at \$7,000, of which \$4,500, has been appropriated up to June 30th, 1893, leaving \$2,500 still to be appropriated to complete the improvement as projected.

A description of the works may be found at page 588, Annual Report of the Chief of Engineers for 1890; and a plan of the same in House Ex. Doc. No. 59, of the 51st Congress, 1st Session; and at page 810 of report of Chief of Engineers for 1893.

At the adoption of the present project, the middle ground shoal carried only about 6 feet depth of water and was a very troublesome obstruction.

During the last fiscal year about one-fourth of this shoal has

been dredged. Work was commenced April 21st, and stopped May 9th, 1893. 9,494 cubic yards of hard sand have been removed from 2,035 feet length and 33 feet width of cutting and to a depth of at least 10.5 feet at low water. No further work has been done up to November 30th, 1893.

As a result of all work up to November 30th, 1893, about three-fourths of the shoal has been dredged to full depth.

There was on November 30th, 1893, only \$19.06 available for continuance of work.

Further work awaits further appropriations.

Vineyard Haven Harbor.

The approved project of 1887, as modified in 1889, provides:— for the protection of the “Chops” (or headlands) from erosion, and the intervening harbor from being filled by the eroded material; the whole to be done by means of stone sea walls and jetties, to be built along the beach in front of the bluffs at both headlands; all at a total cost estimated in 1882 at \$60,000 of which \$42,500 has been appropriated up to June 30th, 1893, leaving \$17,500 still to be appropriated to complete the improvement as projected.

A description of the work may be found at page 594, Annual Report of the Chief of Engineers for 1882; page 577 of 1887; page 612 of 1889; and page 811 of 1893.

At the adoption of the present project, the headlands were gradually wearing away and the adjacent parts of the harbor were shoaling. No protection works were in existence.

During the last fiscal year but little work was done except to enter into contracts for the present season's work.

Work under contract was commenced about the beginning of the present fiscal year, and is still being carried on; 608 tons of heavy stone and 467 tons of light stone having been placed in position in about 800 feet length of sea walls and jetties at the West Chop, and about 341 tons of large stone and 215 tons of light stone at the East Chop; up to November 30th, 1893.

As a result of all work up to November 30th, 1893, there has been constructed a sea wall of 450 feet length, and a jetty of 50 feet length, at the East Chop; and a sea wall of 400 feet length, 3 jetties of from 80 to 296 feet length, a wharf, and a short breakwater of 60 feet length, at the West Chop.

There was on November 30th, 1893, \$1,803.25 available for continuance of work, which funds will probably be used up before May, 1894; after which further work will await further appropriations.

Wareham Harbor.

The approved project of 1880, as modified in 1887, provides:— for the deepening and widening of the channel from Buzzards Bay to Wareham, so as to obtain 10 feet depth at low water over 250 feet width from the entrance up to Barney's Point, and thence the same depth over 350 feet width up to Wareham; and for the raising and protecting of Long Beach (the eastern headland of the entrance) so as to prevent the erosion of this Beach and the shoaling of the adjacent parts of the channel and harbor; all at a total cost estimated in 1887 at \$56,236, all of which has been appropriated up to June 30th, 1893.

A plan of the works may be found at page 586, Annual Report of the Chief of Engineers for 1885; and further information at page 550 of 1881, page 542 of 1887, and page 814 of 1893.

At the adoption of the present project, the headland of Long Beach was wearing off and the adjacent parts of the channel and harbor were shoaling; the channel depth being limited to 9 feet at low water.

During the last fiscal year dredging was continued. During the present year dredging was further continued, 35,874 cubic yards of mud, 1,972 cubic yards of sand stone and gravel and 4 cubic yards of boulders having been removed from 6,118 feet length, and 33 to 40 feet width of cutting and to at least 10 feet depth at low water. Active field work was stopped August 25th, 1893, since which time no further work has been undertaken on this improvement.

As a result of all work up to November 30th, 1893, the channel has been deepened to half width and full depth of 10 feet in its upper portion, and to less width in its lower portions, and the sand spit has been partly protected by catch-sand-fences and brush and stone work.

On November 30th, 1893, there was \$734.26 available for continuance of work, which funds will probably be used up before May, 1894, after which further work will await further appropriations.

New Bedford Harbor.

The approved project of 1887, provides:— for the deepening, widening and straightening of the channel from Buzzards Bay to New Bedford, so as to obtain 18 feet depth at low water over 200 feet width and over its entire length; all at a total cost estimated in 1887 at \$35,000, of which \$27,500 has been appropriated up to June 30th, 1893, leaving \$7,500 still to be appropriated to complete the improvement as projected.

A description of the works may be found at page 514, Annual Report of the Chief of Engineers for 1888; and a plan of the same in House Ex. Doc. No. 86 of the 50th Congress, 1st Session, and at page 815 of report of Chief of Engineers for 1893.

At the adoption of the present project, the channel was winding and only about 15 feet deep.

During the last fiscal year preparations were made for the continuance of the dredging.

Owing to accidents and delays active field work was not commenced until about November 1st, since which time about 15,316 yards of mud and sand have been removed; and work is still in progress.

As a result of all work up to November 30th, 1893, the straight channel has been completed on its western side, to 15 feet depth and at least 80 feet width over its entire length; while a slightly crooked channel of 80 feet width with 18 feet depth also exists over the same distance, wandering a little from the projected channel.

There was on November 30th, 1893, \$4,075.09 available for the continuance of work, which funds will probably be used up before next June, after which further work will await further appropriations.

Westport Harbor.

The approved project of 1888, provides:—for the improvement of the channel from the Atlantic Ocean up the West branch to Adamsville, and up the East branch to Westport Point so as to secure and maintain a channel depth of 7 feet, at low water over its entire length, by dredging on the "Lion's Tongue" shoal if necessary; and for the protection of Horse Neck Point (the eastern headland of the entrance) so as to prevent the erosion of this Point and the shoaling of the adjacent parts of the channel and harbor; all at a total cost estimated in 1888 at \$2,000, all of which has been appropriated up to June 30th, 1893.

A description of the work may be found at page 645, Annual Report of the Chief of Engineers for 1889, and at page 818 of 1893.

At the adoption of the present project, Horse Neck Point was gradually wearing away and the adjacent parts of the channel and harbor were shoaling.

During the last fiscal year, in the month of May, 1893, dredging was carried on, 6,500 yards of sand having been removed from 1,086 feet length and 33 feet width of cutting and to a depth of at least 10 feet at low water. No further work has been done up to November 30th, 1893.

As a result of all work up to November 30th, 1893, the headland

has been protected by one jetty, 150 feet long, made of brush and stone; and a channel 33 feet in width and of at least 10 feet depth at low water has been cut entirely across the shoal at the mouth of the east branch of the Westport River.

There was on November 30th, 1893, no money available for the continuance of work.

Further work will await further appropriations.

Canapitsit Channel.

The approved project of 1891, provides: — for the widening and deepening of the present channel (from Vineyard Sound to the Ocean), between the islands of Nashawena and Cuttyhunk, Mass.; so as to secure a depth of 6 feet at low water with a least width of 150 feet, over its entire length; all at a total cost estimated in 1893 at \$9,800; of which \$4,800 has been appropriated up to June 30th, 1893, leaving \$5,000 still to be appropriated to complete the improvement as projected.

A description of the work may be found at page 645, Annual Report of the Chief of Engineers for 1892; and a plan, at page 820, of 1893; and in Ex. Doc., No. 59, of 52d Congress, 1st Session.

At the adoption of the present project, the sand shoals and especially the occasional boulders, made this passage specially dangerous to the life-saving-station boats and other shallow draft row and sail-boats.

During the past fiscal year in the month of June about 1,155 tons of boulders were blasted and removed from an area of about 1,000 feet length and 300 feet width and to a depth of 3 feet at low water, and also about 1,117 cubic yards of hard sand, 944 cubic yards of cobblestones and gravel, and about 1,223 cubic yards of large boulders, were dredged from 1,214 feet length and 33 feet width of cutting, so as to complete a channel way of at least 66 feet and at least 5 feet depth at low water, entirely through this water way from Buzzards Bay to Vineyard Sound. Excepting the removal of a few individual troublesome boulders in July, no further work has been done up to November 30th, 1893.

As a result of all work up to November 30th, 1893, there has been made entirely through this water way, a channel, 300 feet wide and of 3 feet least depth at low water, including within its limits a narrower and deeper channel of 66 feet width and 5 feet least depth at low water.

There was on November 30th, 1893, a balance of only \$250.84 available for the continuance of this work.

Further work will await further appropriations.

Preliminary examinations of the following localities in Massachusetts, with a view to their improvement by the United States were made during the past fiscal year:—

Woods Holl,
Tarpaulin Cove, Naushon Island,
New Bedford.

With recommendations as follows:—

WOODS HOLL. That the locality was worthy of improvement by the general government and that a survey, to cost perhaps as much as \$1,200, should be made to determine the amount and nature of improvement necessary.

TARPAULIN COVE, NAUSHON ISLAND. That the locality was worthy of improvement by the general government and that a survey, to cost perhaps as much as \$1,000, should be made to determine the amount and nature of improvement necessary.

NEW BEDFORD. That the locality was worthy of further improvement by the general government and that a survey, to cost perhaps as much as \$1,000, should be made to determine the amount and nature of improvement necessary.

Wrecks.

During the last fiscal year the following wrecks were removed so as to no longer obstruct the navigation of this district:—

"J. B. Woodbury," a schooner of 80 tons gross tonnage, from near Life-Saving Station at Monomoy, south end of Cape Cod.

"Bertha J. Fellows," a schooner of 90 tons gross tonnage, from near Life-Saving Station at Monomoy, south end of Cape Cod.

"Francis Edwards," a schooner of 214 tons gross tonnage, from the inner harbor of Fairhaven, opposite New Bedford, Mass.

"Geo. S. Tarbell," a schooner of 525 tons gross tonnage, from about 5 miles southwest of Vineyard Sound Light Ship.

"Sooloo," a coal barge of 962 tons gross tonnage, from near the bell buoy in Pollock Rip Channel.

"Storm King," a coal barge of 1,261 tons gross tonnage, from near the bell buoy in Pollock Rip Channel.

"R. A. Allen," a bark of 576 tons gross tonnage, from Handkerchief Shoal, near the south end of Cape Cod.

"Charlotte Fish," a schooner of 234 tons gross tonnage, from about 4 miles south of Monomoy Light House, Cape Cod.

A schooner, name unknown, from the channel entrance to Nantucket Harbor, Mass.

A schooner, name unknown, from Edgartown Harbor, about 0.6 miles southeast of Edgartown, Mass.

"Alva," a steam yacht of 1151 tons gross tonnage, from the middle of Pollock Rip Channel.

A stone schooner, name unknown, from the edge of Shovelful Shoal near southern Cape Cod.

"Nellie V. Rokes," a schooner of 296 tons gross tonnage, from 0.5 miles southeast of Chatham Light-Saving Station, Monomoy, Cape Cod.

"Rogers," a schooner of 266 tons gross tonnage, from Handkerchief Shoals about 1.5 miles southwest of Monomoy Point, southern Cape Cod.

Since the end of the fiscal year and up to November 30th, 1893, the following wrecks have also been removed so as to no longer obstruct the navigation of this district: —

7 old wrecks, names doubtful, from Vineyard Haven Harbor.

"Acacia," a schooner of 31 tons gross tonnage, from about 6 miles southeast of Chatham, Mass.

Preparations are now being made for removing the following wrecks: —

A wreck, name unknown (supposed to be the "John P. Kelsey") from about 1.5 miles east of Handkerchief Light Ship.

A wreck, name unknown (supposed to be the "G. M. Farnsworth") from Chatham Roads, Mass.

APPENDIX.

APPENDIX.

[A.]

[See page 5 of this Report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS THIRTEENTH DAY OF JUNE IN THE YEAR EIGHTEEN HUNDRED AND NINETY-THREE, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND SETH PERKINS AND JOSEPH E. WHITE, BOTH OF BOSTON IN SAID COMMONWEALTH, CO-PARTNERS DOING BUSINESS UNDER THE FIRM NAME OF PERKINS AND WHITE, PARTIES OF THE SECOND PART.

The said parties of the second part hereby covenant and agree with the said party of the first part, to do and complete all the work specified and described in the following specifications for filling with gravel portions of certain streets on the South Boston Flats, all of said work to be done and completed in the manner, and in accordance with and subject to the terms and conditions, in said specifications set forth:—

Specifications.

Said parties of the second part are to furnish all the plant, tools, appliances, labor and materials for filling with gravel, as hereinafter specified, portions of certain streets on South Boston Flats, as follows: D and E streets from the southerly line of Cypher Street to the southerly line of Congress Street, and Cypher, Claffin, Danby, Egmont and Fargo streets and Mt. Washington Avenue from C Street to D Street and from D Street to E Street, also Anchor and Bullock streets from D Street to E Street, reference being had for the location thereof to a Plan on file in the office of the Board of Harbor and Land Commissioners.

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The portions of D and E streets to be filled are each 2,400 feet long.

D Street is to be 80 feet and E Street 60 feet wide on top at grade 16.

All the other streets are to be 50 feet wide on top at grade 16.

The aggregate length to be filled of all the 50 feet streets is about 6,700 feet.

The depth of the gravel filling to be about 3 feet.

The top surface of the streets, after the work is completed, to be left smooth and level at grade 16, and of the full width above specified measured at said grade.

The slope of the filling on the sides of the streets to be one and one-half horizontal to one vertical.

The material used for filling to be clean, coarse gravel, free from rocks, large stones or boulders, clay, loam and vegetable matter, and satisfactory in all respects to the Engineer of said Board; and to be deposited, levelled and trimmed in accordance with the lines, grades and directions given by said Engineer.

The amount of gravel required is estimated at about 76,000 cubic yards. The amount to be paid for to be ascertained by measurement in the fill after it has been deposited, levelled and trimmed as aforesaid, and no filling to be paid for which is more than 6 inches outside the prescribed lines, grades and slopes.

Measurements of material in the fill, made for the purpose of determining the amount of compensation due the parties of the second part, to be based on the grade of the surface of the bottom before the work is begun, and the grade of the surface of the filling after the work is completed; but no allowance to be made for any settling or compression of the bottom, or for any shrinkage of the filling.

Preparations for the work to begin at once, and the work to begin as soon as practicable, and to be prosecuted vigorously and without intermission in all suitable weather, and the whole work to be completed on or before July 1, 1894.

The parties of the second part to be responsible for all damages to persons or property arising from or in consequence of the work of filling, or from anything done by them in connection therewith. All injuries to sewers, man-holes, catch-basins and connections to be made good by the parties of the second part.

In all questions which may arise concerning measurements, lines and grades, the decision of said Engineer to be final.

All necessary aid and materials for giving or indicating lines and grades to be furnished by the parties of the second part at their own expense ; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said Engineer to be strictly observed and followed.

All of the work to be done to the satisfaction of said Engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

Estimates to be made by said Engineer of the amount of work done and completed up to the end of each calendar month, and payment to be made thereon of ninety per centum of the contract price for such work, as computed by said Engineer ; and the remaining ten per centum to be paid upon the final completion and acceptance of the whole work.

If the parties of the second part refuse or neglect to prosecute the work, or in any other respect fail to carry out the provisions of this contract, said Board may annul the same, and contract anew with other parties, without prejudice to its claim for damages arising from breach thereof.

The word "Engineer" as used herein means the Engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

The words "parties of the second part" mean the persons contracting to do the work, or their agent in immediate charge of the work.

The word "grade" means the grade above mean low water in Boston Harbor, as fixed and used by said Engineer in the work of improvement on the South Boston Flats.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay said parties of the second part the sum of sixty-three (63) cents for each cubic yard of gravel filling measured in the fill as aforesaid, the same to be in full compensation for all the work and other things done, furnished, performed and completed as aforesaid, and to be paid at the times, and in the manner, and upon the terms and conditions, set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of

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the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council; and the said Seth Perkins and Joseph E. White have hereunto set their hands and seals.

THE COMMONWEALTH OF MASSACHUSETTS,

By HENRY W. SWIFT, } *Harbor and*
JOHN I. BAKER, } *Land*
CHAS. H. HOWLAND, } *Commissioners.*

SETH PERKINS. [SEAL.]

JOSEPH E. WHITE. [SEAL.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, June 22, 1893. Approved.

[SEAL OF THE
COMMONWEALTH.]

EDWARD F. HAMLIN,
Executive Clerk.

[B.]

[See page 16 of this Report, *ante*.]

HARBOR AND LAND COMMISSIONERS' OFFICE,
COMMONWEALTH BUILDING, 65 BOWDOIN STREET,
BOSTON, July 8, 1893.

HON. ALBERT E. PILLSBURY, *Attorney General of the Commonwealth of Massachusetts*.

DEAR SIR:—The Board of Harbor and Land Commissioners respectfully submit to you the following question, and request you to give them your opinion upon it for their guidance. The question submitted is as follows:

Are the flats at East Boston, belonging to the East Boston Company and the Maverick Land Company, which are surrounded by a sea-wall with two gaps in it, constructed substantially in its present condition before the year 1866, subject to the jurisdiction of the Board of Harbor and Land Commissioners under the provisions of Chapter 19 of the Public Statutes, or are they exempted from such jurisdiction under the provisions of Section 8 of Chapter 19 of the Public Statutes on the ground that the work of filling said area was begun before the passage of the Act of 1866?

The East Boston and Maverick Companies, through their president Mr. John C. Watson and their counsel Mr. Samuel Snow, have submitted at the request of our Board the enclosed statement of their grounds for claiming such exemption.

We desire to ask your attention to the consideration of the point whether, if the said work was begun at the time of the passage of the Act of 1866, under the construction of that statute laid down by the Supreme Court in the case of *Attorney General v. Boston & Lowell R.R.*, 118 Mass. 345, it has been since continuously prosecuted, so that a filling of the flats now can fairly be considered a part of the same work; or whether the prosecution of the old work has been so discontinued since 1866 that a present undertaking of filling the flats in question would be a new work, and would thus require a license from our Board under the provisions of Chapter 19 of the Public Statutes.

The flats and the wall in question are those which are in plain sight in passing between the city proper and East Boston upon the trains of the Boston, Revere Beach & Lynn Railroad Company.

The larger portion of the flats enclosed by this wall belong to the Maverick Land Company, which was formed by the bondholders of the East Boston Land Improvement Company after default,

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the last-named Company having acquired its property from the East Boston Company. The rest of the flats in question are still the property of the East Boston Company. The two companies are separate but some of their officers are the same. Mr. Watson is president of both companies.

Enclosed will be found a descriptive report of the East Boston Company, printed in April, 1888, which contains a lithograph map showing the properties of the two companies in different colors.

Very respectfully,

For the Board of Harbor and Land Commissioners,

HENRY W. SWIFT,
Chairman.

ATTORNEY GENERAL'S DEPARTMENT,
COMMONWEALTH BUILDING,
BOSTON, July 15, 1893.

TO THE HONORABLE BOARD OF HARBOR & LAND COMMISSIONERS : —

In reply to your inquiry concerning the flats at East Boston belonging to the East Boston Company and the Maverick Land Company, I have to say that upon the facts stated in your communication and in the accompanying statement of the East Boston Company, the work of improving the same is, in my opinion, within the exemption of section 8 of chapter 19 of the Public Statutes.

As the lands in question are private property and are not subject, so far as appears, to any special requirement that the work of filling or improving shall be carried on without interruption, the only question appears to be whether the work yet to be done was begun prior to the passage of the statute of 1866. There appears to have been a substantial beginning of the actual work of improvement of a defined tract of flats prior to that time; and unless the work yet to be done thereupon is so distinct from and independent of the work originally begun as to constitute a new and independent work, and not a continuation of the original work, there seems to be no reason to doubt that it is within the exemption. Assuming the statements of fact now before me to be correct so far as material, I do not think it can be assumed that the work yet to be done upon the territory in question is not a part of the work contemplated in the original scheme, which was defined and the execution of which was begun prior to the statute of 1866.

Very respectfully, your obedient servant,

A. E. PILLSBURY,
Attorney General.

[C.]

[See page 17 of this Report.]

AGREEMENT MADE THIS FIRST DAY OF MAY, 1893, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS AND WENDAL H. WYMAN OF CHELSEA IN SAID COMMONWEALTH.

Said Wyman hereby agrees to break up and remove the three wrecks now lying in the tide-waters of Boston Harbor and located as follows, one near the shore of Chelsea Point in the town of Winthrop, one near the old Elevating Station on the South Boston Flats and one near the head of the Reserved Channel.

After removal the material to be deposited on the filled portion of South Boston Flats as far back from the inclosing sea wall or bulkhead as can be done by the derrick on said Wyman's vessel.

All the work to be subject to the approval and direction of the Engineer of the Board of Harbor and Land Commissioners and to the satisfaction of said Board.

The said Wyman is to furnish at his own cost and expense all the plant, apparatus, materials, appliances, and labor necessary for said work, and to save the Commonwealth harmless from all liability for damages to any person or property caused by or in any way arising from the carrying out of this agreement.

The said work of removal shall be begun at once and shall be prosecuted with due diligence until completion and shall be completed as soon as possible.

Upon the performance of this agreement by the said Wyman to the satisfaction of the said Board of Harbor and Land Commissioners, said Commonwealth agrees to pay to said Wyman the sum of four hundred and sixty-seven (467) dollars, the same to be in full satisfaction for all things furnished and done under this agreement, and for all costs and expenses incurred by him in the performance of the same.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and

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delivered in its name and behalf, and the same to be approved by its Governor and Council and the said Wendal H. Wyman has hereunto set his hand.

THE COMMONWEALTH OF MASSACHUSETTS.

By HENRY W. SWIFT, } *Harbor and*
JOHN I. BAKER, } *Land*
CHAS. H. HOWLAND, } *Commissioners.*

WENDAL H. WYMAN, [SEAL]

In Council, May 4, 1893. Approved.

EDWARD F. HAMLIN,
Executive Clerk.

[D.]

[See page 18 of this Report.]

HARBOR AND LAND COMMISSIONERS' OFFICE,
COMMONWEALTH BUILDING, 65 BOWDOIN STREET,
BOSTON, Sept. 22, 1893.

To the Honorable DANIEL S. LAMONT, *Secretary of War of the United States of America.*

DEAR SIR:—The Board of Harbor and Land Commissioners of the Commonwealth of Massachusetts, in the course of the performance of the duties imposed on them by the laws of that Commonwealth, submit to you the following claim of the said Commonwealth upon the United States, to be repaid the sum of \$7,536.51, expended in behalf of said Commonwealth by its Board of Harbor and Land Commissioners for the removal of wrecks constituting obstructions to navigation, under authority of Chapter 260 of the Acts of 1883 of the said Commonwealth.

Section 1 of said Act is as follows:—

SECTION 1. Whenever a wrecked, sunken or abandoned vessel, or any unlawful or unauthorized structure or thing, is deposited or suffered to be or remain in the tide-waters of this Commonwealth, and in the judgment of the Board of Harbor and Land Commissioners is, or is liable to cause or become, an obstruction to the safe and convenient use of such waters for navigation and other lawful purposes, it shall be the duty of said Board, and said Board shall have power, to remove such obstruction, or cause the same to be removed, in accordance with the provisions of this act.

Section 10 of said Act is as follows:—

SECTION 10. It shall be the duty of said Board of Harbor and Land Commissioners to make application in behalf of the Commonwealth for the reimbursement of any sums expended under this act, which, in the opinion of said Board, might properly be paid by the United States.

We enclose herewith a copy of the last Annual Report of our Board which contains matter relating to the removal of wrecks and claim for reimbursement upon the United States upon pages 6 and 7, and a further report in regard to the removal of wrecks during the year covered by that report on pages 23 and 24. The Board stated in that report that they had in contemplation the making of

a request for such reimbursement by the United States as soon as in their judgment the amount was sufficiently large to ask for.

The expenditures made for the removal of obstructions to international and interstate navigation, and for which in our judgment the United States may properly be asked to reimburse the Commonwealth of Massachusetts now amount, as above stated, to something over \$7,500, and we think it our duty to present this claim to you as being in charge of the harbors of the United States, in order that you may recommend such action to Congress in the matter as you think proper, by way of including this as one of the items in the annual appropriation bill or otherwise.

The expenditures included in the claim are as follows:—

Item 1.

WRECKS OF SCHOONERS "WILLIE LEE" AND "SARAH AND JULIA."

Removed from Edgartown Harbor.

In September, 1883, the Board was notified by the Commissioner of wrecks and shipwrecked goods for Dukes County of the existence of several wrecks in Edgartown Harbor. This matter was referred to Mr. Henry L. Whiting, member of the Board, who visited the locality and reported that two of the five wrecks which he found were liable to interfere with the safe navigation or anchorage room of the harbor. The owners were notified to remove said vessels but failed to do so, and a contract was made with George W. Mudgett dated Feb. 15, 1884, to remove said schooners and their cargoes. The amount paid by the Commonwealth under this contract was \$1,475.00.

Item 2.

WRECK OF SCHOONER "EMILY C. DENNISON."

Removed from Charles River in Boston Harbor.

In May, 1884, the schooner "Emily C. Dennison," loaded with sand, was sunk in the draw-way of the Fitchburg Railroad Bridge on Charles River, causing a serious obstruction to navigation as well as interfering with the passage of trains across said Bridge. The owners were notified to remove said vessel, which they failed to do. On May 28, 1884, the Commonwealth agreed with the Boston Tow Boat Company to pay said Company \$3,500 for the removal of said schooner and cargo to the South Boston Flats. On June 23, 1884, the Boston Tow Boat Company was ordered to deliver to Cyrus L. Harris & Co., all the rigging, fixtures and appurtenances of said schooner in its possession: \$297.30, being the amount received by the Board from the sale of said schooner, was paid into the Treasury of the Commonwealth.

Amount Paid by Commonwealth:

Boston Tow Boat Company,	\$3,500.00
Received from sale of vessel,	297.30
Net cost of removal,	<u>\$3,202.70</u>

Item 3.

WRECK OF SCHOONER "J. P. ANGER."

Removed from Vineyard Haven Harbor.

On January 12, 1888, a petition was received from O. W. Barry and others for the removal of said schooner from Vineyard Haven Harbor. The owners were notified to remove said vessel, but failed to do so, and a contract was made with Charles E. Davis, April 19, 1888, to remove said schooner for \$975. Mr. Davis abandoned the work and a new contract was made with George W. Townsend, May 28, 1888, to remove said vessel for \$1,500.

Amount paid by Commonwealth:

George W. Townsend,	\$1,500 00
Advertising,	3 00
Inspection, &c.,	36 31
Total cost of removal.	<u>\$1,539 31</u>

Item 4.

WRECK OF SCHOONER "ALADDIN."

Removed from Boston Harbor.

In May, 1891, this vessel, loaded with sand, was sunk in Fort Point Channel, near Mt. Washington Avenue Bridge, having been damaged in passing through the draw of the New York & New England Railroad Bridge. The owners executed a release of all their interests in the vessel, cargo and appurtenances, and she was removed by George W. Townsend under contract with the Commonwealth, dated June 4, 1891, for \$500 and the wreckage.

Amounts paid by the Commonwealth:

George W. Townsend,	\$500 00
Watching vessel,	12 00
Total cost of removal,	<u>\$512 00</u>

Item 5.

CARGO OF SLOOP "STAR."

Removed from Boston Harbor.

In April, 1892, the sloop "Star" with a cargo of stone was capsized on the southerly side of the ship channel in Boston Har-

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bor. The stone was considered an obstruction to navigation, and was removed by George W. Townsend, under contract with the Commonwealth, for \$194.

Item 6.

WRECK OF SCHOONER "LIZZIE WILLIAMS."

Removed from Boston Harbor.

In April, 1892, the schooner "Lizzie Williams" was sunk in the centre of the upper middle channel in Boston Harbor. The owners were notified to remove her but failed to do so, and she was removed by George W. Townsend, under contracts with the Commonwealth dated May 2, 1892 and May 12, 1892, respectively, at a cost to the Commonwealth of \$615.

Amounts paid by the Commonwealth:

George W. Townsend,	\$615 00
Use of boats and damage to hawser,	60 00
Total,	\$675 00
Received from sale of vessel,	61 50
Net cost of removal,	\$613 50

SUMMARY OF FOREGOING EXPENDITURES.

Wrecks of schooners "Willie Lee" and "Sarah Julia,"	\$1,475 00
Wreck of schooner "Emily C. Dennison,"	3,202 70
Wreck of schooner "J. P. Anger,"	1,539 31
Wreck of schooner "Aladdin,"	512 00
Cargo of sloop "Star,"	194 00
Wreck of schooner "Lizzie Williams,"	613 50
Total,	\$7,536 51

The Board of Harbor and Land Commissioners have also during the period covered by the above items made other removals of wrecks under the act of 1883, which are excluded from the foregoing claim on the ground that they were for the benefit of local navigation merely, and did not obstruct international or interstate commerce.

I have the honor to be

Very respectfully, yours,

HENRY W. SWIFT,

Chairman of the Board of Harbor and Land
Commissioners of Massachusetts.

SUBJECT: Reimbursement, Removal of Obstructions to Navigation.

WAR DEPARTMENT,

File No. 594-N.

WASHINGTON, D. C., October 2, 1893.

SIR:—I have the honor to acknowledge the receipt of your letter of the 22d ultimo, submitting the claim of the Commonwealth of Massachusetts to be repaid the sum of \$7,536.51 expended in behalf of the Commonwealth by its Board of Harbor and Land Commissioners, for the removal of wrecks constituting obstructions to navigation, under authority of Chapter 260 of the Acts of 1883 of the Commonwealth of the State, which claim you submit with the request that it may be laid before Congress to be included as one of the items in the annual appropriation bill or otherwise.

In reply I beg to quote for your information the following report of the Chief of Engineers, dated the 26th ultimo, in the matter:

“Under provisions of Section 4 of the Act of Congress approved June 14, 1880, the duty of causing the removal of wrecks obstructing or endangering navigation devolves upon the Secretary of War, and he is authorized to make requisition upon the Treasury for the expenses of such removals. This law had been in existence three years at the time the act of the Commonwealth of Massachusetts was passed under authority of which the action herein mentioned was taken, and it would seem that the authorities of the State should have been cognizant thereof.

“Congress having exclusive control of this subject, and having passed a law making all necessary provisions in regard thereto, I am of the opinion that the State of Massachusetts has no legal or equitable basis for the claim herein recited, and I recommend that the Board of Harbor and Land Commissioners be advised that it is not proper for the War Department to recommend any action in the premises to Congress.”

Very respectfully,

DANIEL S. LAMONT,
Secretary of War.

HENRY W. SWIFT, ESQ.,
Chairman Board of Harbor & Land Commissioners, Commonwealth of Massachusetts, 65 Bowdoin Street, Boston, Mass.

HARBOR AND LAND COMMISSIONERS' OFFICE,
COMMONWEALTH BUILDING, 65 BOWDOIN STREET,
BOSTON, Oct. 5, 1893.

Hon. DANIEL S. LAMONT, *Secretary of War of the United States.*

DEAR SIR:—The Board of Harbor and Land Commissioners of Massachusetts have the honor to acknowledge the receipt of your

letter of the 2nd of October, in which you decline to recommend to Congress an appropriation to repay the sum of \$7,536.51, expended by the Commonwealth of Massachusetts for the removal of wrecks constituting obstructions to navigation.

The extract from the report of the Chief of Engineers quoted in your letter declares the policy of the United States to be to claim and exercise exclusive jurisdiction in the removal of wrecks. We therefore respectfully recommend that the statutes of the United States be amended so as to allow immediate action in the removal of wrecks to be taken in the case of an emergency. The provisions of Section 4 of the Act of Congress, approved June 14, 1880, referred to in your letter, require 30 days notice by publication and a further time sufficient to allow the owner to remove the wreck after such notice, so that in practice it is found impossible for the United States authorities to begin the removal of a wreck sooner than 40 days after receiving notice of the obstruction.

This power is in many cases obviously insufficient, and the United States authorities have in several instances been obliged to leave to our Board the removal of wrecks where immediate action was necessary.

The case of the "Lizzie Williams," which occurred last year, and which is mentioned in our Report enclosed in our former letter to you, is an illustration of this. In that case on being notified that the vessel was sunk in the ship channel of Boston Harbor where the ocean steamers and other vessels were passing out and in daily, we found on application to Col. Mansfield, the engineer officer representing the United States in this District, that he was powerless to act without complying with the terms of the Act of 1880, and it was found that the only way to get the vessel promptly out of the channel was for our Board to proceed at once under the authority of the state law, which we did.

Another illustration is the case of the schooner "Emily C. Denison," which was mentioned in our previous letter to you. This vessel loaded with sand was sunk in the draw-way of the Fitchburg Railroad Bridge over the Charles River, causing a complete obstruction to navigation at that point and preventing the passage of trains across the bridge. The statement of this case is sufficient to show how completely inadequate the present provisions of the United States statute are upon this subject, which would have required a delay of from 30 to 40 days before the United States authorities could lawfully remove this vessel from the draw-way.

We therefore respectfully urge that, if the United States desires to reject the assistance of this Commonwealth in performing its duties in regard to the removal of wrecks, it should amend its laws so that these duties may be promptly and efficiently performed by its own officers.

Very respectfully yours,
For the Board of Harbor and Land Commissioners
of Massachusetts,
HENRY W. SWIFT, *Chairman*.

[E.]

[See page 40 of this Report.]

MASS. RESOLVES,

Chap. 148, March 26, 1793.

COMMONWEALTH OF MASSACHUSETTS.

IN THE HOUSE OF REPRESENTATIVES, March 22^d, 1793.

Whereas the Honorable Walter Spooner Esq one of the Overseers of the Marshpee and Herring pond Tribes of Indians and Joseph Nye Esq one of the Guardians of said Indians have by their Memorial represented to this Court that they are unable to preserve the property of said Indians for want of proper and certain boundaries being kept up between the land belonging to said Tribes and the several Towns and Individuals adjoining the same, and they on behalf of said Indians and Josiah Samson, Josiah Fuller, Ebenezer Crocker, Nye Jones, Matthew Briggs, William Fuller and Cornelius Samson being a major part of the proprietors of land adjoining said Indian land and the Selectmen of the Town of Barnstable in behalf of said Town have mutually requested this Court to appoint a Committee to perambulate and settle the boundary lines between the parties.

Resolved that the Honorable George Partridge Esquire of Duxbury in the County of Plymouth, Samuel Smith of Dartmouth in the County of Bristol and Nathaniel Hammond of Rochester in said County of Plymouth be and hereby are appointed authorized and empowered to perambulate and settle the true boundary lines between the lands of the said Marshpee tribe of Indians and the proprietors and Town aforesaid and also to run and settle the line between the land of the said Herring pond tribe and the proprietors of land adjoining thereto, or of said such proprietors as shall concur with said Committee in running and settling said line. The doings of the said Committee certified under their hands to this Court and accepted & recorded in the Office of the Register of deeds of the County where such lands lay to be definite and conclusive between the parties.

Sent up for Concurrence

DAVID COBB, *Spk*.

In Senate March 26, 1793.

Read and Concurred,

SAM^l PHILLIPS *Prsdt*

Approved John Hancock.

MASS RESOLVES,

Chap. 2. Jan'y 22, 1794.

COMMONWEALTH OF MASSACHUSETTS.

IN SENATE, Jan'y 21st, 1794.

Whereas it appears, from the representation of George Partridge Esq^r that by reason of the death of Samuel Smith, the committee appointed by a Resolution of the General Court of the 26th of March last, for perambulating & settling the boundary line between the lands of the Marshpee tribe of Indians & the several Towns & Individuals adjoining the same, are unable to compleat the business of their commission.

Resolved that Isaac Thompson Esq be, & hereby is appointed on the committee aforesaid in the room of the said Samuel Smith deceased and authorized in conjunction with George Partridge Esq & Nath^l Hammond to do & perform all the business designated in the Resolution aforesaid.

Sent down for concurrence

SAM^l PHILLIPS *Prsdt*

In the House of Representatives Jan'y 21, 1794

Approved Jan'y 22, 1794 Read and Concurred

Sam^l AdamsEDWARD W. ROBBINS *Speaker*.

MASS RESOLVES,

Chapter 5, January 22, 1795.

To the Hon^{bl} General Court of the Commonwealth of Massachusetts.

We The Subscribers being Appointed & Commissioned by a Resolve of the 22nd of March A D 1793 & by another Resolve of Jan'y 21st A.D. 1794 to perambulate and settle a boundary Line between the lands of the Mashpee Tribe of Indians And the proprietors and Town of Barnstable — having notified and fully heard all persons and parties Interested in the Settlement — have fixed and determined the said lines and bounds to be as followeth Viz,

Beginning at a Stake well known by the name of the five mile Stake which is a Corner bound betwixt the Towns of Sandwich and Barnstable — said stake stands about five Rods southeast of a deep miry bottom, thence Running south thirty two degrees and three quarters East one hundred and eighty rods to the middle of a small bushe swamp lying by Chopchase field (so called) thence south twentyone degrees east one hundred and ninety one Rods to a stake and stones by the side of an hill about two Rods southwest of a miry swamp — thence south thirty three degrees west one

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hundred and ninety four Rods — to a Stake by the side of a fence — thence West twenty nine degrees south thirty Rods to a brook or River Called Somtuite alias Contuite River a little below a pond called Somtuite alias Contuite pond — thence down stream by the middle of said River to paupanesset bay — thence by said Bay to the sea — leaving two Islands — of salt marsh or flats called Thatch Islands lying in said bay to appertain and belong to the district of Mashpee — Witness our hands the seventh day of october A D 1794.

Ge^o Partridge
Isaac Thomson
Nath^l Hammond

In Senate Jan^y 21^d 1795. Read & accepted & Ordered that the same be entered on the Records of the Commonwealth

Sent down for concurrence

SAM^l PHILLIPS *Prsdt*

In the House of Represen^{ts} Jan^y 22^d 1795

Jan^y 22, 1795

Read and Concurred

Approved Samuel Adams

EDW^d W ROBBINS *Spkr*

COMMONWEALTH OF MASSACHUSETTS.

OFFICE OF THE SECRETARY, BOSTON, November 1, 1893.

I certify the foregoing to be true copies of the original papers in the custody of this Office.

Witness the Seal of the Commonwealth,

[SEAL]

ISAAC H. EDGETT,
Deputy Secrelar

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PUBLIC DOCUMENT

. No. 11.

ANNUAL REPORT

OF THE

BOARD OF HARBOR AND LAND
COMMISSIONERS

FOR THE YEAR 1894.

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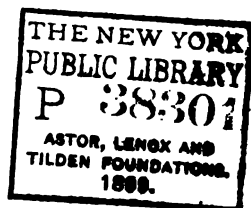


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FOR THE YEAR 1894.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1895.

Commonwealth of Massachusetts.

REPORT.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Board of Harbor and Land Commissioners, pursuant to the provisions of law, respectfully submits its annual report for the year 1894. The last report terminated with the 30th of November; this report covers a period of twelve months from that date.

HEARINGS AND INSPECTIONS.

The Board has held one hundred and sixty-three formal sessions during the year, and has given one hundred and thirty-one hearings. One hundred and nine applications for licenses for structures and for privileges in tide waters and great ponds have been passed upon; of these applications, one hundred and eight were granted and one was refused.

One formal hearing was given at North Falmouth, and the others in the office of the Board in Boston and in the State House.

During the year the commissioners have personally inspected the proposed location of a boat house, to be built in Sandy Pond in Lincoln; the proposed location of a wharf, to be built by the town of Marblehead in Marblehead harbor; Slate wharf in Boston; the wharf of Linus M. Child in Winthrop; the wharf of the Marblehead Gas Light Company in Marblehead; the wharf of Edward B. Lane; and the location of a proposed wharf at Tuck's Point in Beverly. An inspection has also been made of Cataumet harbor; of the protective works on the Connecticut River at West Springfield; of the Connecticut River bank in

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Agawam; of the protective works at Hadley; of the work which has been done during the year on the province lands in Provincetown; and of certain marsh lauds in Boston, Winthrop and Revere.

CHARLES RIVER DAM.

Chapter 85 of the Resolves of 1894, entitled "Resolve directing the Board of Harbor and Land Commissioners to inquire into the proposed construction of a dam and lock in Charles River basin," reads as follows: —

Resolved, That the board of harbor and land commissioners are hereby directed to inquire into the construction of a dam and lock in the tidal basin of Charles river, as proposed in the report of the metropolitan park commission and the state board of health, sitting as a joint board, with special reference to interference with tide water and its effect upon the harbor of Boston, giving an opportunity to be heard to persons desiring a hearing thereon, and to report thereon in print to the next general court within ten days from the commencement of the session thereof; and a sum not exceeding fifteen hundred dollars is allowed for necessary expenses of such inquiry and hearing, to be paid out of the treasury of the Commonwealth.

After public notice in the newspapers and special notice to the following cities and towns on the Charles River, to wit, Boston, Cambridge, Newton and Watertown, an investigation in compliance with the resolve was begun at the State House on October 3, and continued, by adjournments from time to time, up to Dec. 7, 1894. Seventeen hearings in all were had, and both sides of the question were ably represented by counsel. John E. Abbott, Esq., of Watertown, G. A. A. Pevey, Esq., city solicitor of Cambridge, and W. S. Slocum, Esq., city solicitor of Newton, appeared in support of the report of the joint Board; and Hon. John D. Long, Hon. William E. Russell and John T. Wheelright, Esq., appeared in remonstrance. The Citizens' Association of Boston appeared by Herbert L. Harding, Esq.

The Board construed the language of the resolve "*with special reference*," etc., to intend that it should inquire into all the consequential effects of the construction of the pro-

posed dam and lock. This interpretation was invited, moreover, by the fact that there had been no public hearing on the questions involved, although large public interests were to be affected. Such inquiry would necessarily include the sanitary condition of the lower Charles River, as well as the harbor of Boston; and pursuant thereto all persons coming before the Board and "desiring a hearing thereon" were heard. Prominent citizens appeared and were heard on both sides, and learned and accomplished experts were examined and cross-examined with astuteness and elaboration, a wide scope of interrogation being permitted in pursuing the investigation. Notice was given to the State Board of Health and to the Board of Metropolitan Park Commissioners. The State Board of Health sent its engineer, Mr. Frederic P. Stearns, and its biologist, Professor Sedgwick, who appeared, gave their testimony to the Board, and submitted themselves to an exhaustive cross-examination by the counsel of those opposed to the proposed dam. Resolutions, votes and orders favoring the project, from the following, viz., Cambridge Medical Improvement Society, Citizens' Improvement Association of Ward 25, Hunnewell Hill Improvement Society, Massachusetts Association of Boards of Health, Garden City Improvement Society of Newton, Cambridge Club, Citizens' Trade Association of Cambridge, City of Cambridge, City of Newton and Young Men's Assembly of Watertown, and a resolution of the Boston Associated Board of Trade, in opposition, were presented and filed with the Board, and remained open to the inspection and comments of all parties interested. A large amount of documentary and statistical evidence was also introduced on either side.

A stenographic report was taken, by arrangement with counsel, and a limited number of copies were typewritten for the convenience of those engaged in the investigation. It is obviously impracticable within our present limits of time and space to cite or even to report in detail all the oral and written evidence adduced on the one side and on the other. All that can be attempted will be to summarize the essential facts and considerations having a bearing on the questions at issue.

In respect to what would be the probable effect of the proposed construction, two main subjects were considered: first, what would such probable effect be upon the tidal basin of the harbor; and, second, what upon the health of the surrounding community. These and minor ones were ably discussed in the testimony of the experts and the arguments of counsel.

Consideration of all the questions raised has been given by this Board, with due appreciation of the gravity and importance of the inquiry, and with due realization of the necessity of avoiding error in reaching conclusions which, if influential in inducing any legislation, would lead to changes in present conditions, that, resulting unfavorably, it might be difficult if not impossible to restore. The greatest possible weight was given to the report of the joint Board, especially to its conclusions on the sanitary question whereon the opinions of the State Board of Health are rightfully held to be of the highest authority; and, in so far as this Board may have arrived at any conclusion differing from that report, it has been reached with the greatest reluctance, and, while entertaining the profoundest respect for the judgment with which it differed, it was because this Board was unable to find that the testimony within its reach justified a concurrence of opinion.

The physical features of the Charles River and the territory near its banks from Waltham to the Navy Yard are fairly shown on the plans accompanying the Report of the Joint Board upon the Improvement of Charles River, a public document (House, No. 775, 1894), hereinafter referred to as the "joint report," and which should be read in connection with this report. It has been said by eminent authority that Charles River ends at Cottage Farm, or Essex Street bridge, whence begins the bay or basin, and thence the harbor. The distance from the Waltham line to Cottage Farm is 8 miles; to the Charles River bridge is 10.8 miles. The area of water surface at mean high tide above the line of proposed dam is 960 acres (of which about 300 acres lie above Cottage Farm), and at mean low tide 651 acres, leaving 309 acres of flats and sloping banks exposed at low tide; of these, 179 acres are below

Cottage Farm and 130 acres are above it. More than nine-tenths of the river bank between Watertown dam and Cottage Farm is still in its natural state, and the extensive areas of salt marshes are to a very large extent unoccupied.

The average daily flow of the fresh water of Charles River may be reckoned at 220,000,000 gallons, or 340 cubic feet a second.

The level of high tide extends to the foot of the Watertown dam, within about half a mile of which salt water goes. The higher tides overflow the marshes, on a total area of 524 acres, at times in places to a depth of two feet and over.

The river ebbs and flows in a winding course through the spreading marshes, gradually increasing in width and depth so that the area of its cross-section at different points is nearly proportional to the amount of tide water passing them. At Cottage Farm the river widens rapidly into a broad basin of something over two miles in length, with a maximum width between the harbor lines of about half a mile. This basin is being walled and dredged to below the level of low tide, although at present some areas of flats are exposed. The river is the natural drainage channel for more than 200 square miles of territory, on which, within two miles of either bank within the district considered in the joint report, at present dwell not less than 500,000 inhabitants, with the prospect of a far larger number in the future. The pollution of its waters and shores had been going on uninterruptedly for a long time, until the conditions became so offensive as to necessitate remedial measures. With the completion of the metropolitan sewerage system it is expected that the nuisance will abate.

Referring to the basin, Mayor Matthews, in his address in 1891, says there undoubtedly exists "in this basin the opportunity for making the finest water park in any city in the country." The suggestion is one that grows more conspicuously attractive the longer it is studied, and the grounds in favor of it are strongly advocated in the joint report.

An attempt to summarize the views of the joint Board must necessarily result unsatisfactorily. The body of their report is brief, and its analytical table of contents is an easy guide to any point therein discussed.

In advancing reasons in favor of and against the proposed dam and lock, so thoroughly is the ground covered by the joint report that no new point of view was raised by the remonstrants. Those favoring raised two. One was that the United States government might use the basin as a fresh-water dock for its iron and steel vessels when not in use. To this it was objected, however, that the infusion of salt water, according to the proposed plan, in summer, and the freezing of the dock for several months in winter, might prohibit the enjoyment of this prospective advantage; and also that the United States government ought first to signify its wishes in that respect, and its willingness to bear a part of the expense. The other was the uses that might be made of so large a body of fresh water lying so near the city for manufacturing, fire and other purposes, tending to save drafts on the purely domestic water supply.

The question of the effect of the proposed plan, if carried out, upon the health of the district, was most fully presented at the hearing on both sides beyond the evidence contained in the joint report. The chief points contended for by the remonstrants and supported by weighty evidence were:—

1. That the district affected could be neither properly drained nor sewered if the water in the river were to remain at grade 8; for the ground water could not be reduced to a level sufficiently low for health in the lowlands, whereby malarial conditions would be promoted, nor could the same be properly sewered without expensive pumping.

2. That the storm-water overflow from the sewers, which could not be taken care of by the metropolitan system in times of rain, would carry so much sewage matter into the basin to be made by the proposed dam as to become both offensive and injurious to health; and especially would this be the case with Stony Brook and Muddy River overflows; also, the Back Bay Fens basin would become a nuisance, or the avoidance thereof, if possible, could be accomplished only at disproportionate cost.

3. That the mingling of salt with fresh water in the basin in summer, for the purpose of renewing the contents thereof, would destroy the fresh-water plant life, and thus create stinking odors in hot weather, as well as unhealthful conditions.

To the foregoing and lesser objections on sanitary and other grounds this Board listened, as it had interpreted the resolve of the Legislature to intend that it should; but in view of the final conclusion, reached entirely on other grounds, and of the expectation that the whole evidence may be printed, it is thought to be unprofitable to indulge in any discussion of the testimony. This Board has given the highest degree of weight to the opinion of the State Board of Health, relying upon its great experience in dealing with the questions involved in this inquiry, combined with its accumulated advantages and facilities in considering matters with which it is entirely familiar and concerning which it has the traditions, history and data of a quarter of a century of investigation; and in the light of that opinion it is unable to say, in view of the irreconcilable testimony of experts given at the hearings, that the conclusion of the joint Board may not justify the experiment so far as sanitary objections are concerned.

THE HARBOR.

The “special reference to interference with tide water and its effect upon the harbor of Boston” contained in the resolve contemplates a question of wide and far-reaching inquiry, but one with which it is peculiarly the business of this office to deal.

The policy of the Commonwealth and of the United States, in considering the preservation of the harbor as dependent upon maintaining the tidal reservoirs in the up-river basins, is questioned in the joint report. It cannot be questioned that an equilibrium of forces has for some time existed and now exists favorable to the preservation of the harbor. How broad the margin of that equilibrium may be is beyond our present knowledge. A disturbance of the tidal reservoirs large enough to affect that equilibrium might be productive of most serious consequences to the harbor.

As early as 1835 the effect of the tidal currents upon the channels in Boston harbor became a matter of public inquiry. The first Board of Commissioners for the survey of the harbor was appointed, consisting of three eminent civil engineers,

and the first complete survey was then made. Between 1835 and 1850 eight different commissions were appointed, consisting of the leading engineers of the day, and the tenor of all their reports is the same. They all unite in affirming the necessity of preserving to the largest extent possible reservoirs that aid in scouring the channels of the upper harbor. In 1859 General Totten, Chief of Engineers, U. S. A., Professor Bache, superintendent of the coast survey, and Com. C. H. Davis of the United States Navy, were constituted a commission "to investigate and report upon the condition of Boston harbor, with a view to its preservation and safety for the interests of navigation." At the decease of General Totten he was succeeded by General Delafield, U.S.A. Messrs. Henry Mitchell and Albert Boschke acted as assistants and consulting engineers to the Board. During a period of six years of exhaustive observation and research this Board made ten reports, in all of which the maintenance of all the interior basins as tidal reservoirs is emphatically urged. In their tenth and final report (Boston City Doc., No. 50, 1866), page 33, the following were among the conclusions reached:—

"A. Tidal harbors depend upon interior reservoirs for the preservation of their channels.

"B. The efficiency of these reservoirs depends upon their areas, upon the capacity of their outlets, upon their distance above the port, upon the vertical rise of the tides which occupy them, and the back waters they may receive.

"C. A reservoir is limited in the usefulness of its area and tidal volume by the capacity of its outlet to fill and drain it within certain limits of time for effecting scour.

"D. The distance at which a reservoir may be useful is limited by that at which, by communicated activity, it can quicken the currents in the harbor below, without deranging their epochs; and the depth of any reservoir has a usefulness dependent upon the same limitation.

"E. As the distance increases, the value of the lower portion of the tidal prism diminishes, as regards its useful action in the harbor below; so that at the extreme limit the reservoir becomes a meadow, overflowed by high water only.

"The destruction of tidal reservoirs which fulfil the con-

ditions stated in *D* is a step towards the destruction of the harbor. No proposition to reclaim basins, flats or salt meadows should be entertained till the measure of their usefulness in the harbor has been investigated; and no expense for deepening or enlarging such tidal receptacles should be incurred till, from the best data, a prediction of its probable advantage to the harbor can be made.

“In nature we scarcely find tidal reservoirs fulfilling exactly the conditions stated in *D*; but in all good harbors there are close approximations to them. Most reservoirs can be improved artificially, and in some harbors useless reservoirs may be found.”

Again, at page 35: “We have thus far treated the action of the tides without taking into consideration the changes of wave form. Changes in wave form, however, actually occur in all channels, and, in a critical study of the mechanical effects of tides, are not to be neglected; because, obviously, upon these we depend, in great degree, for the evolution of power by means of tidal currents.”

Again, at the foot of the same page: “Considerable time intervenes between a negative cause and its full effects; the disuse into which a channel may fall is not a direct or positive cause of its injury; but its destruction nevertheless follows inevitably from its abandonment to the other activities of nature. When we perceive that a channel remains unchanged from year to year, we are accustomed to say, and with truth, that an equilibrium is maintained; in other words, that, relatively speaking, the constructive and destructive agencies of nature are in mutual check.”

After thus discussing the necessity for tidal reservoirs and the effect of scour on the channels, the report takes up the consideration of compensation for tide water displaced from the basins by encroachments on the tidal prism. The tidal prism is the body of the tide lying between the planes of high and low water. The doctrine of tidal compensation is formulated at page 43, as follows: “Tidal compensation, as we have used the expression, is a restitution in kind for tide water displaced. If a harbor is dependent upon its tides for the existence and good depths of its avenues, no diminution of tidal volume can be suffered without robbing these avenues

of those scouring and cleansing agencies upon which their natural form and maintenance depends. If the requirements of an increasing trade or population are such that the reclaiming of portions of the harbor is unavoidable, this may be permitted without fear of injury, provided it does not encroach upon the tidal paths, and provided also that physical compensation is made by opening elsewhere receptacles for tide water which shall be an equivalent. We say equivalent, because a mere transfer of a portion of the tidal prism from one point to another may or may not be a source of injury, may or may not be an advantage. If the transfer, however, is made, guided by rules carefully evolved from a physical study of the harbor, a new receptacle of tide water may perhaps be chosen, possessing all the advantages of position of the natural one, or even more. It is the restitution upon such principles that we mean by the expression tidal compensation."

Again at page 48: "OBSERVATIONS OF THE TIDES AND CURRENTS SHOULD ACCOMPANY ALL OPERATIONS WHICH MAY MATERIALLY CHANGE THE FORM OF A HARBOR. THE INCREASE OR DECREASE OF EVERY ELEMENT OF POWER, WHICH THE TRANSPOSITION OR DISTURBANCE OF TIDE WATER MAY EFFECT, SHOULD BE WATCHED AND EXAMINED. TO PROCEED IN ANY OTHER WAY IS TO WORK BLINDLY, IGNORANT OF A BLUNDER TILL TOO LATE TO RETRACE OUR STEPS, — IGNORANT OF AN ADVANTAGE TILL THE OPPORTUNITY OF IMPROVING UPON IT IS LOST."

Again at page 50: "The main channel of the upper harbor of Boston is chiefly dependent for its depth and width upon its service as the avenue of supply and drainage for the basins of the Charles and Mystic rivers and Chelsea creek. Were these reservoirs closed, the larger part of this main artery would, in the course of time, cease to exist; for it is but the trench dug through the yielding bed of the harbor by the passage, to and fro, of the river and tidal waters."

After an examination of the observations of the currents of the river basins and of the main channel in which the rates of the river and tidal flow are separately ascertained and combined, and their power over movable objects in their path determined, the report (page 53) says: "We are brought

to the conclusion that Boston harbor is mainly dependent upon the volume of tide water for its deep-channel ways; but that its back water, although scantily supplied, is an important element."

Again, after deducing from tables of observations the relative powers of the ebb and flood tide at different points in the upper harbor, and considering the nature and extent of the various obstacles existing in the river, and their effect upon the currents both as to their velocities and the form of the channels, the report at page 85 goes on to say: "You ask us to advise you in the conservation of your harbor, *and we recommend as a matter of primary importance to this end that you solicit of the Legislature the passage of a law PROHIBITING ANY FURTHER DISPLACEMENT OF THE UPPER HARBOR TIDE WATER WITHOUT COMPENSATION.*"

These were the deliberate conclusions of the most eminent authorities in the country, after the most careful examination the harbor has ever received.

As a consequence of these masterly reports, the Legislature established the Board of Harbor Commissioners in 1866, and gave them the care of the harbors and tide waters in the Commonwealth, in order to prevent encroachments liable to interfere with navigation of the harbors, or to injure their channels, or to cause a reduction of their tide waters. Subsequently by repeated acts of legislation the Commonwealth has adopted, ratified and acted on the opinions declared in these reports, and has established the maintenance of tidal reservoirs and the doctrine of compensation as a part of its broad policy in the preservation of its harbors and tide waters.

In 1871 this policy was vigorously attacked. The city of Boston asked the Legislature to relieve it from payment of the assessment made by the Harbor Commissioners for compensation on account of tide water displaced by the construction of Atlantic Avenue, alleging that the theory upon which compensation rested was "entirely exploded and abandoned."

At the hearing before the legislative committee on harbors Prof. Benjamin Peirce, superintendent of the United States coast survey, testified in favor of the theory of compensation, saying: "I must say further that in every case in

which there has been a loss of reservoir to Boston harbor it has been a serious injury, and the injury is now going on."

Prof. Henry Mitchell said: "The channels are kept clear by the scouring force of the water which comes from the tidal reservoirs, and any diminution of power will be followed by a filling in of material. . . . I presume that the effects following the loss of reservoir do not ultimate for a great many years, and that is one of the points which I consider in connection with compensation in kind. It is one of the studies that we have made."

Gen. J. G. Foster, then stationed here by the United States, and having charge of improvements in the harbor, testified: "Whereas, if you open the throat of Charles River and do the dredging above, that will create a water power operating forever. . . . If the throat of the river was open and excavations should be made in the reservoir above, we should have a scouring force for all eternity. . . . You cannot encroach upon the tidal volume anywhere without affecting the scour."

Prof. Henry L. Whiting, chief of topography in employ of United States coast survey, testified as follows: "Q. Whether or not, in your judgment, Boston harbor is one that is maintained by scour? A. I think so unquestionably. Q. What, in your judgment, is the effect of diminishing the volume of tide water? A. I think just as much as you diminish it you lose power, or lose the force which was originally there, and which created the channels. But for the fact of these reservoirs existing, and of the narrow outlets and the islands contracting and forming the upper harbor as a basin, we should have had no deeper water than there is in Quincy Bay or other bays that have not this peculiar formation."

These opinions controlled the report of that committee, and the policy was sustained. All the United States engineers who have been called upon to give their opinion on Boston harbor, without a dissenting voice, have upheld the theories in support of this policy.

So late as 1891 the Harbor Line Board of United States Engineers, in an elaborate and carefully considered report, has reaffirmed the doctrines already hereinbefore set forth,

and declined to permit any solid filling beyond the bulkhead line in Mystic River. We are given to understand, by a recent letter from the Chief of Engineers, U. S. A., that there is no report on file at Washington showing any departure from these doctrines. Whether or not the theories are wholly or only in part correct, the fact remains that they represent the adopted and settled policy of the Commonwealth and of the United States; and, while it may be argued that the Commonwealth has in its permissions to encroach beyond the harbor lines impliedly perhaps at times questioned the doctrine, the United States has unequivocally and continuously reasserted and reaffirmed its adherence thereto in the most positive terms. The supremacy of the United States over all questions affecting its harbors and tidal basins has been given latest utterance in the act of Congress entitled "An act making appropriations for the construction, repair and preservation of certain public works on rivers and harbors, and for other purposes." This became a law in August, 1894, and is as follows:—

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

SECT. 9. That whenever the secretary of war grants to any person or persons permission to extend piers, wharves, bulkheads, or other works, or to make deposits in any tidal harbor or river of the United States beyond any harbor lines established under authority of the United States, he shall cause to be ascertained the amount of tide water displaced by any such structure or by any such deposits, and he shall, if he deem it necessary, require the parties to whom the permission is given to make compensation for such displacement either by excavating in some part of the harbor, including tide-water channels between high and low water mark, to such an extent as to create a basin for as much tide water as may be displaced by such structure or by such deposits, or in any other mode that may be satisfactory to him: *provided*, that all such dredging or other improvement shall be carried on under the direction of the secretary of war, and shall in no wise injure any existing channels.

In the reports of this Board, whenever from time to time there has been occasion to express an opinion upon this question, the true policy of the Commonwealth in dealing with

the tidal reservoirs as vital to the unimpaired maintenance of this harbor has been adhered to with unyielding steadfastness.

The proposed plans of the joint Board for building a dam in Charles River appeared to be based upon the proposition of the engineer, joint report (page 20), viz: "that the maintenance of the present currents in the upper harbor is not essential to its preservation. In the first place, the currents at the present time are not strong enough to cause an effective scouring of the bottom; and, in the second place, under the conditions which now exist and which will exist more fully in the future, no considerable quantity of solid matter will find its way into the harbor to cause it to shoal."

It is conceded on all sides that the present condition of the harbor is good. It must be admitted that this is in some degree owing to the dredging done by the Commonwealth and the United States government.

The difficulty with drawing inferences from natural causes while artificial operations are interfering in their results is referred to in the report of the United States Harbor Line Board, 1889, as follows: "But much desultory dredging has been done by the State and the general government at different times since 1860, usually without increase to the tidal prism; and, as data are still wanting to enable the Board to analyze causes and effects sufficiently to formulate a satisfactory theory of the action of the forces in operation, it considers it best to defer any discussion of the physics of the harbor until the subject can be more thoroughly investigated."

Bearing in mind that what is suggested to be done may affect the welfare of generations yet unborn for centuries to come, we are met at the outset with the question, What information is necessary to justify the conclusion that so permanent a change can be made without detriment? In order to answer this question understandingly and with certainty, knowledge on the following points is essential:—

1. The exact present condition of the harbor.
2. Just what forces are acting either to improve, maintain or in any way injure it.

3. What effect the proposed lock and dam will have upon these forces.

4. The causes of the shoalings that have from time to time occurred in the harbor, and the material of which they are composed.

5. Whether the natural bottom of the upper harbor is or is not abraded by the currents, and moved from place to place.

Comparative studies should be made of all the plans and records of all general surveys and examinations of Boston harbor, and of similar harbors, and to supplement the information thus obtained by further surveys and examinations to cover the portions not sufficiently covered or not covered in sufficient detail, or not at all covered.

A series of observations of the currents should be made; as, since the current measurements were made in 1861, large areas on the South Boston flats and in Charles, Miller's and Mystic rivers have been filled, and the deep-water channels in the upper harbor have been materially enlarged by dredging.

Physical examinations should be made by borings or otherwise, and also microscopical and chemical examinations of the material composing the bottom of the harbor to a depth of several feet, especially where the soundings indicate that there has been considerable shoaling, in order to assist in determining the source and amount of all deleterious and foreign substances.

The foregoing data should be collected under the direction of a competent hydrographic engineer, with the assistance of an advisory board of engineers, before any conclusions can be formulated which would justify so radical and permanent a change as is contemplated in the proposed plan.

The evidence adduced at the hearing in favor of the plan, so far as it affected the harbor, was, perhaps necessarily, to a large extent desultory and inconclusive. That which was opposed to it was largely expert and other opinion, and recorded observations taken almost if not quite wholly from the reports and data on file in the office of this Board. To all the foregoing has been added a copy of a plan showing a portion of the soundings taken by the United States Coast

and Geodetic Survey, 1892, received at the office of this Board since the hearings closed. This has been compared with the plans of previous surveys, and the results of this comparison are hereinafter stated.

Among the observations recited in the tenth report aforementioned were some relating to the velocity of the river and tidal currents, the results of which are tabulated. From these it appears that the velocities of ebb and flood currents rarely exceed one mile an hour between Boston and East Boston. According to Du Buat, a velocity of .15 of a mile an hour is sufficient "to remove clay fit for pottery," with which the stiff clays forming the natural bed of portions of the harbor are classed. It further appears from the periods during which the velocities below the bridges exceed .3 of a mile an hour, that the ebb maintains this excess for five hours eighteen minutes, the flood but three hours fifteen minutes. "Du Buat's experiments show that sand may be moved or rolled by a current of .3 of a mile per hour, so that at one station, by this combination of river and tidal forces, a grain of sand would daily make two journeys, one up river, represented by 3.15, the other seaward, by 5.18. The seaward gain is therefore fully in the proportion of 5 to 3; there is then at this point power sufficient to keep the channel free. . . . Except for the tides hurrying through this avenue to and from the basin above, the present good depth of water could not be maintained." (Tenth report, page 52.)

The tidal flow of the river averages about 370,000,000 cubic feet of water, which would be cut off by building the dam. From these observations and opinions it is clear that the ebb in Charles River runs out longer than the flood runs in, and that a scour in the upper harbor is maintained, of which it is at least a cause. We cannot but be satisfied on all the testimony that the scour maintains the channels; and, although the dredging machine is resorted to frequently, we are not yet ready to welcome it wholly as a substitute for natural forces.

We come now to the question of shoaling. It appears from the report of the United States Harbor Line Board (1889) that shoaling took place above Anchorage Shoal

and deepening off the Navy Yard between 1835 and 1861, and the reverse was the case between 1861 and 1888. A comparison of the survey of 1892 with that of 1861 shows shoaling 604,780 cubic yards and deepening 29,626 cubic yards, from which it appears that a movement of material is constantly taking place in the harbor.

The subjoined table shows the shoaling and deepening at four places in Boston harbor. The four surveys from which the comparisons were made are as follows: survey in 1835, by B. F. Perham, under the direction of commissioners appointed by the Legislature; survey in 1861, by Albert Boschke, under the direction of the United States Commissioners on Boston Harbor; survey in 1888, by S. Haagensen, under the direction of the United States Harbor Line Board; survey in 1892, by United States Coast and Geodetic Survey. The comparison 1835 to 1861 was made under the direction of the United States Commissioners on Boston Harbor; 1861 to 1888, under the direction of United States Harbor Line Board; 1861 to 1892, under the direction of the Harbor and Land Commissioners.

LOCALITY.	1888-1891.				1891-1898.				1901-1902.			
	Excess of		Deepening (Cubic Yards).	Shoaling (Cubic Yards).	Excess of		Deepening (Cubic Yards).	Shoaling (Cubic Yards).	Excess of		Deepening (Cubic Yards).	Shoaling (Cubic Yards).
	Shoaling (Cubic Yards).	Deepening (Cubic Yards).			Shoaling (Cubic Yards).	Deepening (Cubic Yards).			Shoaling (Cubic Yards).	Deepening (Cubic Yards).		
From Craigie's bridge, 1,350 feet up Charles River,	41,440	-	-	-	-	-	-	-	57,403	1,481	-	85,322
Mouth of Charles River, below Charles River bridge,	-	108,080	-	149,889	-	2,000	147,889	-	150,059	-	-	136,056
Mouth of Mystic River, below Mystic wharf,	7,400	245,480	-	201,029	-	18,702	185,927	-	220,055	4,444	-	222,311
Navy Yard to Union wharf,	77,700	140,600	-	52,855	-	129,914	-	77,559	184,063	23,701	-	130,362
Totals,	126,540	491,160	-	408,873	-	147,816	833,816	77,559	604,780	29,026	-	876,184

It is said in the tenth report (page 58) that the “tendency of modern improvements has been to make the anchorage basin the receptacle for the river muds, instead of leaving to the river basins their original offices. We consider the narrowing of the channel opposite the city as involving for the present a difficulty; . . . Our idea of the remedy is to increase the *basins* above, to check the activity of the currents in the river basins, and to quicken those in the harbor; although, as we have shown, sand and muds are accumulated in different ways, or rather by dissimilar methods, under the action of the same forces; the means of prevention in this case are the same.”

In the report of the 1871 hearing (page 43) Professor Mitchell was asked: “Did you ascertain that the deposits made in the inner harbor were deposits from streams, or had their origin outside the harbor?” He answered: “That is a very difficult thing to determine. An examination was made by Mr. Pourtales of the material at the bottom of the channel, and he considered that no sewerage was indicated. He did not find sewerage except upon certain shoal flats of no importance. But he found the material composing elsewhere the banks and bed of the stream. We *know* also that *material* comes in from the ocean and is deposited in the lower harbor, and is kept out of the channels by the scour of the currents.”

The opinion of the expert, relied upon by the joint Board, is obviously irreconcilable with the views of the experts of the federal government, which we have above sketched; and at this late day, and in consideration of the concurrence of this Commonwealth in the validity of the policy and views of the federal government, we are not prepared to ignore the one which has hitherto been accepted and to adopt the theory of novel impression.

Moreover, this Board is powerless to say, on the imperfect information it has, what effect a dam as proposed would have on shoaling in the upper harbor. We must, however, record the opinion that *nobody knows what the effect would be*. Upon a careful consideration of the testimony presented, and of all the evidence within the knowledge of the Board, we are unable to find the consequences of building the proposed dam

as at all certain of being foreseen ; and in view of the incalculable injury which might ensue from impairing the usefulness of the harbor, we are unable to report in favor of the recommendations contained in the report of the joint Board.

SOUTH BOSTON FLATS.

The work of filling and improving the tide water lands known as the Commonwealth's flats at South Boston has continued during the year on the general plan previously followed. A portion of the principal work done during the year has been the completion of the filling of the area which the Eastern Dredging Company agreed to fill under contracts dated July 1, 1892, and Jan. 1, 1893. The method of doing this work was described in our last report, and the filling has been done in a satisfactory manner. Under this contract 43,647 cubic yards of material have been furnished and deposited on the lot north of Congress Street since Dec. 1, 1893. Another portion has been the depositing of about 33,500 cubic yards of gravel in building streets south of Congress Street, under contract with Messrs. Perkins & White, dated June 13, 1893. In May, 1894, financial difficulties compelled these contractors to stop work, and it was not until August that the Board was notified of their readiness to proceed. The time for completing the contract had then expired, and a new contract was made with the same parties, dated Aug. 3, 1894, which provides for completing the work on or before April 1, 1895, and also for doing the work at the rate of not less than 7,500 cubic yards per month (see Appendix A). Since August 1 the work has progressed more satisfactorily than before, and the quality of the gravel furnished is good.

Sept. 12, 1894, a contract was made with the New England Dredging Company, the lowest bidder, for supplying about 120,000 cubic yards to fill the balance of the enclosed area of about 70 acres lying north of Congress Street. The material is to be obtained by dredging away the bar at the mouth of Chelsea creek to the depth of 18 feet below mean low water, and by dredging in the reserved channel on South Boston flats. This will make the reserved channel 12 feet deep at mean low water and 115 feet wide at its narrowest

place. This work is to be completed by Sept. 1, 1895, and the contract provides that not less than 10,000 cubic yards per month shall be dredged and deposited after Sept. 1, 1894 (see Appendix B). Work has been commenced under this contract.

During the year the filling by carts seeking a dumping place for surplus material from cellar excavations in the city and other city rubbish has been quite large. It has been mostly placed on the parcel north of Congress Street, and a portion has been used to level up low spots in the parcel south of Congress Street, where the filling taken from the harbor had settled below grade 13.

In June the L Street bridge, which was completed in December, 1892, was partially opened to travel, and is quite generally used, although Congress Street from the Boston wharf to the bridge remains in the condition stated in previous reports. It is in a very rough condition, and almost impassable for heavy loads through lack of paving. The plank sidewalk on the southerly side of Congress Street, which was under construction at the time of our last report, has been completed, and extends from the L Street bridge to and partially across the New York & New England Railroad Company's property.

Nothing has been done since the adjournment of the last Legislature about carrying Congress Street by a bridge over the tracks of the New York & New England Railroad Company. The last Legislature referred the matter to the next General Court. The appointment of a commission to abolish the grade crossing under the general act has not been made. There is urgent necessity for action in this matter. This Board recommends legislation forwarding some plan for elevating the street. The unfinished condition of this street is preventing the commissioners from making any successful efforts to sell or otherwise dispose of the property advantageously, and no leases or sales have been made during the past year; and the entire property, with the exception of the filling above described, remains as before.

At present direct access to the Commonwealth's property from the city proper is wholly over the Congress Street bridge. This bridge was built in 1874 and 1875, and has

been in constant use under a very heavy traffic ever since; and the time has come, or is very near, when, according to the report of the city engineer of Boston (City Doc., No. 10, 1894, page 20), safety will demand its rebuilding, the planking under the paving of the roadway being rotten in many places and requiring removal. This bridge cannot be closed to traffic without very seriously interfering with the business now transacting on the flats, as all teams will have to go nearly up to First Street and then into the city over Mt. Washington Avenue or Federal Street bridges from one-half to one mile out of their way in each direction. Should the Northern Avenue bridge at the foot of Oliver Street be now built, it would tend to prevent the foregoing inconvenience to the public.

On Jan. 31, 1894, final payment having been made on a prior contract of sale, a deed of land, covering an area of 78,545.5 square feet on the south side of Congress Street, was executed and delivered to Thomas Cunningham.

The buoys in the reserved channel have been renewed, and minor repairs made to the bulkheads and other structures.

The work now under contract will complete the filling to grade 13 of all the territory enclosed by sea walls and bulkheads, and the filling to grade 16 of all the streets which have been laid out; and the State will then have, and practically now has, a magnificent property of 170 acres, including streets, with a frontage towards the harbor of 2,600 feet, or about half a mile, and stretching back towards South Boston for three-quarters of a mile. The filling of this territory and the dredging and deepening of the harbor in front of it and the channels leading to it have been slow and tedious work, as the material required a long time to dry out and compact itself in the fill, and the amount of material handled (some of it twice over) has been very large. It has taken about 5,000,000 cubic yards to fill this parcel. Between this territory and the harbor line on the northerly side of the flats is an area 1,300 feet wide and 2,600 feet long, for building the wharves, slips and docks to accommodate any and all classes of steamships and vessels. These piers and slips can be built without very much delay, as soon as the plans thereof shall be perfected. A pier 300 feet wide,

1,200 feet long, having its centre 200 feet wide filled solid and enclosed by a sea wall, and having a belt of pile platform 50 feet wide around it, will cost in the vicinity of \$300,000. Upon this as a foundation it will be necessary to build sheds, storehouses, etc., to protect the freights and cargoes.

The flats lying to the eastward between the reserved channel and the harbor line contain about 253 acres susceptible of improvement whenever a demand shall arise.

These areas with a total harbor frontage of about 8,400 feet will provide abundant dock and wharf facilities for the growing commerce of Boston, and at the same time give ample railroad yard room for handling and transshipping freight direct from the cars to the holds of the vessels, and *vice versa*, whereby the charges for transportation may be reduced to the minimum. In the eager competition for traffic, the modern commercial city has made a study of inviting business by offering scientifically systematized dockage, warehouse and transportation facilities, as an examination of the recent modern improvements in that direction at Marseilles, Hamburg, Manchester, Liverpool and Glasgow will show. The enterprising public spirit which has recently aroused the discussion of this question in Boston, and seeks for municipal or State control and management of the wharves and docks in her harbor, has its counterpart in this country in the schemes already actively pushed in favor of the greater commercial success of Philadelphia and New York.

As early as 1875 this Commonwealth began to foresee the advantages to be derived from enlarging areas suitable for docks and wharves, and has by repeated legislation encouraged the public to look forward to the ultimate development of the unusually convenient and adaptable locality at South Boston.

Before recommending specifically, however, the direction of further improvement, the attention of the Legislature should be called to the existence of a public need, the great usefulness of which will be universally recognized, — and that is, a public dry dock, with capacity for a larger class of vessels than is now provided for, the lack of which is a detri-

ment to the growth of our commerce to-day. The aforesaid flats afford an admirable location for such a structure. They possess every advantage of convenience and accessibility both by land and water.

A convenient time has arrived for the Commonwealth to outline a policy with reference to the further development of these filled lands. Should the Legislature see fit to favor the public ownership of docks and wharves, and to use these unencumbered lands for that purpose, the following elements of a plan are submitted, in the hope that they may be of some aid in preliminary deliberations, with a view to occupying the lands with a system of piers and docks, including a dry dock capacious enough for the accommodation of the largest vessels. It is suggested, first, that the Commonwealth can if desirable borrow money for a long term of years at a low rate of interest, in amounts as needed to carry the improvement as far as the Legislature shall determine; second, that the management and control of the docks may be in the hands of a Board, a large proportion of whom should be elected by dock and wharfage rate payers, whose qualification shall be a payment of dock and wharfage rates to an amount of not less than _____ in the year preceding the election, and no rate payer should be eligible for membership to the Board unless he has paid double the aforesaid amount of rates in that year; third, that out of said rates should be paid interest, repairs and running expenses, and a sum into a sinking fund for the redemption of the loan.

A map showing the filled land and the dock and wharf outlines adjacent thereto is hereto appended.

The balance in the Commonwealth's flats improvement fund on the first day of December, 1893, was \$78,874.31. To this has been added during the year \$787.79 from the income of the fund, \$3,711.40 from rents of land, and \$40,000 paid into the fund from the treasury of the Commonwealth under the provisions of chapter 93 of the Acts of 1889 and chapter 48 of the Acts of 1894, making a total of \$123,373.50. Of this sum there has been expended during the year \$31,941.12, leaving an available balance Nov. 30, 1894, of \$91,432.38. It is estimated that this balance will

be sufficient to pay for all the work now contracted for, including the expenses incidental to its completion.

In order to provide for continuing the improvement of these lands should it be determined to build piers and docks along the harbor front, it is estimated that \$400,000 should be paid into the fund for the year 1895.

SURVEYS, ETC.

The work on South Boston flats has occupied a large part of the time of the engineering force; and, in addition to the work of making monthly estimates and giving lines and grades for work progressing, the general plan of the flats on scale 200 feet to 1 inch has been corrected and brought up to date.

In December, 1893, at the request of the harbor master and the pilots, a survey was made of the improvements at and near Mystic wharf, in order that the depth of water might be ascertained for the benefit of arriving and departing steamships. The map of the wharf and bridge lines was corrected and brought up to date, and the channel was sounded from the Charlestown to the Chelsea and East Boston shores. Reductions of this survey were made and placed on the chart made by the United States engineers from their survey of 1888, and copies of this were furnished to the harbor master, pilots and steamship agents.

Dec. 20, 1893, levels were taken on the flats of Messrs. Whitney and Viaux in Cambridge, to determine the amount of tide water displaced by their filling.

At various times during the year surveys were made to mark out the ranges for locating the dredging to be done in carrying out the various contracts for removing shoals executed during the year. The work was frequently inspected while in progress, and the various areas dredged, carefully sounded and examined upon the completion of each contract and before the work was accepted.

In March a survey was made of the bar at the mouth of Chelsea Creek, upon complaint that the channel was shoaling at that point; and this survey was connected with that made in December near Mystic wharf.

Early in June a survey was made of the main harbor front from Constitution wharf to Union wharf; the wharf lines were resurveyed where they had been changed since 1878, and soundings were taken from the harbor line out to the deep water in the main channel.

In June and July twenty-five new triangulation points were established in and around Charles River basin; the shore and vicinity was resurveyed and the plan brought up to date.

In September and October a survey was made of the harbor front of East Boston from Carleton's wharf to the Boston, Revere Beach & Lynn Railroad Company's ferry-slip. The wharf lines were resurveyed where they had been changed since the survey of 1878, and soundings were taken from the harbor line out to the main channel, except at the easterly end, where the soundings were only carried as far out as Bird Island Shoal.

March 26, 1894, the annual survey and levels were taken on Salter's Beach near the Gurnet at Plymouth. This is the sixth year these measurements have been made. They show that the beach shifts slightly from year to year, but as yet it has not shown a tendency to make any permanent change.

Oct. 29, 1894, levels were taken at Fresh Pond in Plymouth, and a bench mark established for reference in fixing the levels at which the surface of the water in the pond should be maintained.

In September twelve stone bounds were set to mark the boundary line on tide water between Mashpee and Barnstable, and their location was marked on the ground, and then surveyed and plotted on the plan of Popponesset Bay made in 1893. Two copies were made of this plan, and deposited as provided by chapter 172 of the Acts of 1894, — one in the office of the secretary of State, and one in the registry of deeds for the county of Barnstable.

Accurate plans have been made of all surveys, and the results put in such form as will make them of permanent value. A large number of manuscript and lithograph plans have been repaired and mounted on cloth, and arranged as well as is possible with the present limited accommodations. They have mostly been indexed in a card catalogue; but

even this has outgrown its quarters, and as the cases are full, a large number of the cards have to be kept in paste-board boxes. The plan cases are crowded and breaking down, and many plans have to be kept in unsuitable places, wherever room for them can be found around the office. There are many pamphlets, also, relating to various harbors, especially Boston harbor, that should be arranged, but at present there are no facilities for so doing.

The invaluable plans in this office ought not to be longer subjected to the present fire risk than is inevitable in waiting to find suitable accommodations for this Board in the State House extension.

HARBOR IMPROVEMENTS.

In January bids were invited for the removal of shoals in Neponset River, South Bay and Charles River. This was done after considering the requests of parties interested in navigation at each place. The removal of the shoals was undoubtedly of such general benefit as to justify its being done by the Commonwealth and paid for from the income of the compensation fund for Boston harbor.

On Feb. 6, 1894, a contract was made with Boynton Bros., the lowest bidders, to dredge a channel in South Bay 2,000 feet long, 60 feet wide and 10 feet deep at mean low water, for the sum of \$3,400, and thus remove the complained of shoals. This contract was satisfactorily completed and the work accepted June 6, 1894. (See Appendix C.)

On Feb. 6, 1894, a contract was made with Perkins & White, the lowest bidders, to dredge channels through the shoals in Neponset and Charles rivers to the depth of 10 feet at mean low water, for the sum of \$4,400 for the Neponset River and \$5,500 for the Charles River. No work was done under the contract, as the contractors soon after became financially embarrassed, and therefore unable to execute the work, and the same was cancelled and the work given to the next lowest bidders, with whom contracts were executed as follows: April 18, 1894, with the New England Dredging Company, for the work in Charles River, for the sum of \$6,465. (See Appendix D.) April 24, 1894, with the Eastern Dredging Company, for the work in Neponset River,

for the sum of \$6,365. (See Appendix E.) The work under both these contracts was completed in a satisfactory manner, and accepted as to Neponset River Sept. 4, 1894, and as to Charles River Sept. 25, 1894.

June 2, 1894, a letter was received from the agent of the Merchants and Miners Transportation Company (Baltimore steamers), stating that the steamer "Fairfax" had grounded Feb. 25, 1894, on a shoal directly opposite the north ferry-slip on the Boston shore. The ferries were blocked for some time and the bottom of the steamer was scraped considerably. A survey was made by the engineers, who while so engaged saw another steamer ground on the shoal. Plans and specifications were prepared for removing the shoal, and the work was advertised Aug. 14, 1894. In the mean time another letter was received, stating that on August 5 the steamer "Gloucester" had grounded on the shoal for one and one-quarter hours. On Sept. 4, 1894, a contract was made with the Eastern Dredging Company, the lowest bidder, to remove the shoal to the depth of 23 feet below mean low water, for the sum of \$4,650. The work was satisfactorily completed and accepted Oct. 15, 1894. (See Appendix F.)

March 1, 1894, a complaint was made to the Board that the channel in front of Campbell's wharf in Chelsea had shoaled so that vessels coming there had to be lightened before they could reach the wharf. Upon investigation it was found that while the depth of water was the same as at the time of the last survey in 1861, yet a bar existed across the channel, and there was insufficient depth of water to accommodate the class of vessels using the channel. Plans and specifications were prepared for dredging a channel 200 feet wide and 18 feet deep at mean low water through the bar. This work was included in the contract for filling on South Boston flats, inasmuch as the material dredged would be used for said filling. Work under this contract has begun. (See Appendix B.)

CHARLES RIVER EMBANKMENT COMPANY.

During the year the work of filling the flats east of Massachusetts Avenue in Cambridge has progressed rapidly, and

nearly the whole area of about 50 acres, inclosed by the sea wall and bulkhead, has been filled to above high-water mark. About 727,000 cubic yards have there been deposited. The material was nearly all taken from the flats in front of the area filled, and between the sea wall and the channel of the river. This area of flats of about 34 acres, which was formerly nearly all exposed at extreme low water, has been dredged to a depth of from 10 to 16 feet at mean low water.

West of Massachusetts Avenue about 36,500 cubic yards of filling have been placed on the the filling previously deposited, and a small amount of gravel has been dredged from the flats opposite.

The work done by the Embankment Company in connection with the work done by the Commonwealth gives a depth of 10 feet at mean low water in the channel of Charles River as far up as Brookline bridge, except a small area at the draw in Harvard bridge. Large areas of flats on both sides of the river still remain exposed at low water.

FORT POINT CHANNEL.

On Aug. 21, 1894, a communication was received requesting the deepening of the Fort Point Channel. Upon inquiry, it was ascertained that the condition of the piling of the New York & New England Railroad bridge was such that dredging the channel through the draw could not be done with safety. The depth of the channel at present is about 16 feet. In order to provide a depth of water sufficient for the larger vessels to navigate, it is necessary that the channel should be deepened. This involves the rebuilding of this bridge.

In the annual report of the Chief of Engineers, U.S.A., to the Secretary of War, Sept. 29, 1894 (page 553, Appendix B, report of Lieut.-Col. Mansfield), occurs the following: "It (Fort Point Channel) connects the tidal basin of South Bay, which has an area of 250 acres, with Boston inner harbor, is fast becoming the centre of the city's most extensive shipping trade, and is the most important branch of the main ship channel. . . . Before improvement the least depth at mean low water was 12 feet at its entrance and 17 feet above Congress Street bridge. That part of it which it

is proposed to improve is spanned by bridges at Congress Street, Mount Washington Avenue and at an intermediate point. The bridges have conveniently located draw openings, but the draw piers of the *railroad* bridge must be strengthened or reconstructed before the improvement can be extended past them, and the width of the draw increased to that of the other bridges above and below it. The project for this improvement was submitted Jan. 27, 1885. It proposed the excavation of a channel 175 feet wide and 23 feet deep at mean low water from the entrance to near Federal Street bridge, a distance of 4,100 feet, and was estimated to cost \$100,000, the railroad bridge to be reconstructed at the expense of the owners. By the act of Aug. 5, 1886, \$18,750 was allotted for the improvement of this channel from the appropriation for Boston harbor."

The condition of the New York & New England Railroad bridge is an obstruction to the improvement of the navigation of Fort Point Channel; and until it is rebuilt so as to admit of the necessary deepening, the improvement of the channel will have to remain in abeyance. Legislation in this direction is recommended.

OYSTER CULTURE.

During the summer a complaint was made by private individuals who navigate Cataumet harbor against the licensee of the owner of flats over which the waters of Current River ebb and flow, for planting oyster shells thereon for the purpose of seeding, or "catching the oyster seed." At the hearing it appeared that the oyster shells were spread most effectually when spread singly; that they did cause a shoaling to the extent of their thickness; that they had some tendency to impede navigation, and possibly had some influence on the movements of the sand on the flats at the mouth of the harbor.

The Board was satisfied that in this case there was no material interference with the full navigation of the waters of Cataumet harbor, or injury to its channels, such as to require its intervention. It appeared that the industry is a new one, comparatively, in this Commonwealth, and that the places where the shells, when planted, would "catch the

seed," between the rise and fall of the tides are not common, and had to be selected with great care and discrimination; that the native oyster beds could no longer be relied upon for supplying the needed oysters; that seeding along the waters of Buzzard's Bay and the Falmouth coast was a growing industry; and that the use of waters favorable to this culture was a means of producing the seed at far less cost than they could be purchased from out the State.

It is thought that this new food industry should be encouraged, so far as it possibly can without injury to others' rights; and, in order to avoid conflict with parties wishing to use their flats for this purpose, inasmuch as it is claimed that the statute provisions for planting oysters were not intended to apply to planting oyster shells for the purpose of "catching the seed," it is suggested that the local authorities should be granted power to license the use of flats for this purpose in the first instance. These authorities ought to possess local information necessary to determine whether such use of flats can be made without material injury to navigation or other damage; but should be invested with this power subject to the approval or revision of this Board, in the exercise thereof.

CONNECTICUT RIVER.

The general care and supervision of the river and its banks were committed to this Board by chapter 344 of the Acts of 1885.

Early last winter the selectmen of Agawam applied to the Board for the protection of the river bank in their town, where the Connecticut threatened to wash away the highway which runs adjacent thereto for about two miles. The chairman and the engineer of the Board visited and examined the locality with the selectmen. The selectmen petitioned the Legislature for an appropriation to build protective works along the bank; and by chapter 101, Resolves of 1894, \$2,000 was appropriated for the work.

Messrs. E. C. and E. E. Davis of Northampton, civil engineers, were employed to have the immediate supervision of the work, and the Board and its engineer visited the locality with Mr. E. C. Davis, and gave directions as to the

plan and manner in which the work should be done. The work was begun in September and finished in November. The appended report of Messrs. Davis gives the details as to the execution of the work.

To the Honorable Board of Harbor and Land Commissioners of Massachusetts, WOODWARD EMERY, Esq., Chairman.

GENTLEMEN:—The following is a report upon the work done the past season in the town of Agawam for the protection of said town and the highway near the Connecticut River bank against the further encroachments of the Connecticut River, under the provisions and appropriation made by the Legislature in chapter 101 of the Resolves of 1894, and approved June 25, 1894.

After an examination by your Board the past summer of the condition of the westerly bank of the river from the South End bridge, southerly, in Agawam, and the encroachments of the river upon the highway and the adjoining property, the part selected for the expenditure of the appropriation was a reach of the river bank in front of the property of Mr. John Riley, commencing at a point 782 feet above the northerly line of the "Calla Shasta" grounds, so called, and extending from that point up the river, this being the place where there was the greatest immediate danger, the river having already invaded several hundred feet in length of the highway location.

Active operations were commenced September 22, and the work completed November 22. Seven hundred and eighteen feet in length of the river bank has been protected with the appropriation made.

The same general methods and plans were adopted for this work as were used for the works in Hadley and West Springfield.

The bank was first graded to a uniform slope of two and one-half to one, and upon this slope were laid mats of willow and other brush, and these overlaid with a riprap of broken stone about eight inches in thickness. The work extends from near low-water mark in the river to the top of the bank at the level of the highway, the average width of the slope being 36 feet, and the number of square yards covered

2,872. It is proposed to set small willows on this slope next spring, there being a sufficient amount of the appropriation remaining unexpended which may be used for this purpose. These willows will serve as a support for the riprapi work after the decay of the mats above the average water line.

The contract for furnishing and delivering the stone was awarded to Messrs. Porter & Kellogg of Agawam, at \$1.85 per cubic yard. They were brought from the red sandstone quarries in East Longmeadow, and the contractors have fulfilled their part of the contract promptly and in good faith.

A tract of willows and other brush was bought of Messrs. S. W. Gates & Son on the Longmeadow side of the river, and these were brought over to the works on flat boats.

Local help only has been employed, the workmen being citizens and tax payers of Agawam, under the immediate direction and oversight of Mr. W. C. Campbell, one of the selectmen of the town, to whom much credit is due for his faithfulness and ability, as displayed in the prosecution of the work.

The total expenditures the past season have been \$1,974.19, leaving an unexpended balance of \$25.81, for setting willows, as before stated.

We are of the opinion that this work, if extended another season, will tend to materially deepen the channel of the river immediately against the work as well as for a considerable distance both above and below it, and also to preserve intact the highway and adjoining property from further invasion by the river. Our experience with similar work in the towns of Hadley and West Springfield, and from soundings that have been taken before and at different times after these works were constructed, lead us to express this opinion as to the future conduct of the river at this place.

The work we recommend to be done next year is to continue the present work 100 feet further up the river, and also to extend it down the river from the point of beginning of the past season's work to the northerly line of the "Calla Shasta" property, a distance of 782 feet. There is also a reach of about 400 feet in length, immediately below the homestead of James Green and about 7,500 feet above the

terminus of the past season's work, which should receive attention next year, making a total of 1,282 feet.

Before the work is constructed between the present work and the "Calla Shasta" grounds, the town of Agawam should be required to raise the grade of the highway against this place to high-water mark. It is now submerged in times of high water, and any overflow on the crest of works that might be constructed there would seriously endanger its stability.

The culvert under the highway at this point should also be lengthened, to correspond with the additional width of embankments consequent upon raising the highway.

Respectfully submitted,

E. C. and E. E. DAVIS,

Engineers.

NORTHAMPTON, MASS., Dec. 1, 1894.

The chairman and engineer of the Board visited the work during its progress, and found it to be done in a very satisfactory and substantial manner. They also visited the protective works at West Springfield (done under chapter 90, Resolves of 1891), and at Hadley (done under chapter 95, Resolves of 1888, and chapter 17, Resolves of 1889), and found them to be well preserved and in good condition. The willows at Hadley must be cut in a few years and allowed to sprout out from their roots. If the trees are allowed to get too large they are liable to loosen the riprap around their roots and allow the water to get in and make a breach in the work.

WRECKS AND OBSTRUCTIONS.

In December, 1893, complaint was made that a portion of the old Fort Hill dry dock was ashore on the southerly end of Thompson's Island, and upon investigation it was found that it had floated on a high tide from its moorings on the southerly shore of South Boston, and had grounded finally on the shore of the Island. The owner, Mr. Ralph W. Dean, was notified, and about the middle of January, 1894, it was removed by him.

Dec. 28, 1893, Capt. W. H. Bixby, Corps of Engineers,

U. S. A., at Newport, notified the Board that the schooner "Annie W. Akers" was lying sunk and abandoned in Hyannis harbor, and was an obstruction to navigation. Upon investigation it was found that she had been wrecked on a shoal in Nantucket Sound with a cargo of laths; that Capt. Benj. Mallows, underwriters' agent at Chatham, had taken charge of her and employed the Boston Tow Boat Company to tow her to Hyannis, where she was grounded, and her cargo discharged; and that the wreck was sold, stripped and then abandoned where she lay. In the opinion of the Board the wreck was an obstruction to navigation, and a notice to remove it was served on Captain Mallows. Shortly after the wreck was removed by Captain Bixby at the expense of the United States.

Jan. 25, 1894, Mr. Dole of Newbury notified the Board that the sand schooner "A. Baker" was lying sunk and abandoned in Plum Island Sound, near the southerly end of Plum Island in Ipswich, and was an obstruction to navigation. Upon investigation it was found that the owner had no means of removing her, and Lieut.-Col. S. M. Mausfield, Corps of Engineers, U. S. A., in charge of the rivers and harbors in this district, was requested to have her removed. He did not think the vessel was an obstruction to general navigation such as would justify him in recommending her removal by the United States government. After considering the matter further, the Board asked for bids for removing her, but deemed all those received to be too high. The matter rested for a while, until a bid was obtained from Mr. Anton Graf of Georgetown to remove the wreck for \$195; on May 29, 1894, the Board made a contract with him to remove the wreck for that sum, and the work was completed and approved June 20, 1894. (See Appendix G.)

June 14, 1894, Mr. Crosby notified the Board that an old barge or scow was lying sunk and abandoned near Commercial wharf in Nantucket harbor; that it was an obstruction to navigation, and asked to have it removed. Upon inquiry Mr. Crosby reported that it was an old barge or scow which had belonged to the Coatue Land Company, and had been loaned to the Nantucket Beach Street Railway

Company as a tenement for their laborers, but had become uninhabitable and was abandoned. Captain Bixby was notified by the Board, and he, after investigation, reported that it was not such an obstruction to general navigation as would justify him in recommending its removal by the United States government, but sent a plan showing its location, and stated that the name of the barge was the "John Mason." The matter of the removal of the wreck is still under consideration.

Oct. 5, 1894, the James Bros. of Hull reported that the bottom of an old vessel was lying sunk and abandoned in Hull Bay, on a line between Seal Rocks and the westerly end of Bumkin Island. Upon investigation and inquiry, it was found to be the bottom of an old vessel about ninety feet long, lying in about six feet of water at low tide, with its top under water at all times. Colonel Mansfield was notified, and asked to remove it, but replied after investigation that it was not such an obstruction to general navigation as would warrant him in recommending its removal by the United States government. The Board has advertised for proposals to remove the wreck.

REIMBURSEMENT FROM THE UNITED STATES.

In the report of the Board for 1893 it was stated that the commissioners had submitted to the Secretary of War the claim of the Commonwealth to be repaid by the United States the sum of \$7,536.51, expended by the Board, under the provisions of chapter 260 of the Acts of 1883, for the removal of wrecks in tide waters, and had received from the secretary a communication containing an extract from a report of the Chief of Engineers, U. S. A., on this subject, recommending that the Board of Harbor and Land Commissioners be advised "that it is not proper for the war department to recommend any action in the premises to Congress." (Appendix D in the 1893 report contains a statement of the wrecks and expenditures, together with the correspondence with the Secretary of War.)

Inasmuch as it is made the duty of the Board, by section 10 of said act of 1883, to make application for the reimbursement of any sums expended under said act which, in

the opinion of the Board, might properly be paid by the United States, and that it is the opinion that said sum of \$7,536.51 should be paid by the United States, this matter is respectfully called to the attention of the Legislature for its consideration.

LEGISLATION BY CONGRESS.

In the river and harbor act of 1894 Congress has seen fit to assume jurisdiction over the regulation of draws in bridges across the navigable rivers and other waters of the United States, by rules to be formulated by the Secretary of War in the public interest. It further legislates with respect to permitting the deposition of matters in a liquid state into any harbors or rivers of the United States which may be liable to injure them; and again it directs the Secretary of War to ascertain the amount of tide water displaced under his authority, and to require compensation therefor. These provisions, as being of interest to the public in this Commonwealth, will be found printed in full in Appendix H, hereto annexed.

THE CLAIM OF THE FISK HEIRS.

After careful research among the plans on file in this office and such as could be discovered elsewhere, upon full consideration, the Board concluded that no such claim of right had been substantiated as would justify its approval of the payment of money out of the treasury of the Commonwealth without an adjudication in favor thereof by a court of competent jurisdiction, and so notified the claimants.

BACK BAY LANDS.

At the time of the last annual report complaints were pending for alleged violations of restrictions in the deeds of the Commonwealth conveying lots on the Back Bay lands. These complaints having been carefully considered after due hearing, the following conclusion was reached:—

COMMONWEALTH OF MASSACHUSETTS.

HARBOR AND LAND COMMISSIONERS' OFFICE,
COMMONWEALTH BUILDING, 65 BOWDOIN STREET.

DECISION OF THE BOARD OF HARBOR AND LAND COMMISSIONERS IN
THE CASE OF THE COMPLAINT AGAINST DR. WILLIAM P. WES-
SELHOEFT AND DR. JAMES B. BELL FOR MAINTAINING PRO-
JECTIONS UPON THEIR HOUSES RESPECTIVELY AT 176 AND 178
COMMONWEALTH AVENUE, IN ALLEGED VIOLATION OF RESTRIC-
TIONS IN THE DEEDS OF THE COMMONWEALTH.

The houses complained of were built in the year 1883, and since that time no change has been made in them. The petitioner who now makes complaint is Dr. Henry O. Marcy, who owns and occupies the adjoining house, 180 Commonwealth Avenue, which he purchased after the decision of the Algonquin Club case in 1891. Dr. Marcy's petition to this Board was filed on Oct. 12, 1893.

The two houses complained of are exactly similar in construction. Each has two front doors on Commonwealth Avenue, — one at the outer corner, used by the family, and one at the inner corner, where the two houses adjoin, used as the entrance to a doctor's office. Over the doors project structures supported by pillars, which are claimed by the owners of the houses to be porches or porticos appurtenant to the four doorways. Between these alleged porches are bay windows, or octagon fronts. The upper portions of the alleged porches form a straight line of solid masonry in the nature of a shallow balcony (except where the bay windows fill the same), extending across the entire width of the two houses. The projecting parallelogram thus formed is within the five feet within which certain projections are permitted, and the bay windows already mentioned are within the required trapezoids.

We decide : —

First. — That the projections complained of do not constitute an advancing of the lower story of the two houses, such as was held in the Algonquin Club case to be a violation of the restrictions.

Second. — That the structures over the two doorways of each house constitute porches, such as were held to be porticos in the case of Attorney-General v. Ayer, 148 Mass. 584.

Third. — That the several conjunctions of the porches or porticos with the bay windows or octagon fronts, each conjunction being taken by itself, are not violations of the restrictions ;

such a mode of building being declared to be permissible in the opinion in *Attorney-General v. Algonquin Club*, 153 Mass. 447, 451-453.

The question remains whether, although each of these porches is in itself lawful and constructed in a permissible manner, their combination with the bay windows in such a way as to substantially occupy the whole of the five feet of the reserved space allowed for such projections is not a violation of the restrictions in the Commonwealth's deeds.

This question can only arise where a house has two front doors. If the doors of the doctors' offices did not exist, and the projections over them, being no longer porticos, were removed, the nature of the construction would resemble that of a large number of houses on the Back Bay on land similarly restricted.

In the opinion in the *Algonquin Club* case, above referred to, the court declare that they "have come to the conclusion that the restriction in the deed does not forbid such a mode of building that the base of the trapezoid of a bay window may overlap upon a portico or balcony." The question here is, whether such an overlapping with a portico or balcony is permitted on both sides of the same bay window. If it is, the structures complained of are within the terms of the restrictions. There is no provision in the deeds that a house should have only one front door or only one portico; and, if a house has two front doors, there must be a right to have a portico over each, so that the extension of the projections along the whole front of the building by the conjunction of the bay window with the two porticos may be said to be an incidental result of the exercise of a permission expressly given.

A combination of several bay windows so as to produce this result would not be permitted; but bay windows are projections of another class, in regard to which there are special restrictions, and the distinction is clearly made in the *Algonquin Club* case (pages 450-452). The difference in the terms of the restrictions in regard to the two classes of projections is probably founded on the fact that a bay window or circular or octagon front often extends to the full height of the building, and constitutes an advancing of a portion of the wall of the house itself; whereas balconies, porticos and steps are projections which the eye distinguishes as beyond the wall of the house, and do not, except in case of balconies, extend beyond the first story.

On the whole, we do not feel justified in ordering an alteration of these structures at the present time, and the petition therefore is dismissed.

For the Board of Harbor and Land Commissioners,

HENRY W. SWIFT, *Chairman*.

42 HARBOR AND LAND COMMISSIONERS. [Jan.

ATTORNEY-GENERAL'S DEPARTMENT,
COMMONWEALTH BUILDING, BOSTON, JUNE 7, 1894.

HON. HENRY W. SWIFT,

Chairman Board of Harbor and Land Commissioners.

SIR:— I am in receipt of your favor of June 6, requesting me to examine the draft of decision proposed to be given by your Board in the matter of the complaint against Dr. William P. Wesselhoeft and Dr. James B. Bell.

I have to say that I have examined the same with care, and agree with the conclusions of law therein expressed.

Very respectfully yours,

H. M. KNOWLTON, *Attorney-General.*

Upon complaint that Galvin Bros. were keeping a flower shop in the Hotel Vendome, at the corner of Commonwealth Avenue and Dartmouth Street, notice was given to discontinue the use of the premises for such purpose, as in violation of the restrictions in the deed of the premises from the Commonwealth. The objectionable use was subsequently discontinued.

PROVINCE LANDS.

The work done during the year on that portion of the province lands at Provincetown placed in charge of the Board by chapter 470 of the Acts of 1893 has been the construction of a road, and the planting of Scotch broom and trees to stop the blowing sands.

From reliable information we find that the province lands are occupied in spots by parties making use of the land for various purposes of agriculture, for cutting grass and for pasture, many of them under a claim of right; some of them, to the number of thirty-nine, were assessed by the Board of Assessors of Provincetown in 1893; others, to the number of forty-three, occupied bogs and other land without charge, and of these there is no list in the assessors' office.

While there may be strong public and State reasons for reclaiming these lands from the sandy desert condition in which they to a large extent now exist, we can see no good reason why they should not be made to yield an income, if there are people who desire to use them. It is conceivable that, if some kinds of grasses can be made to grow on these

waste sands, and the blowing of them about by violent gales can be prevented by the growth of shrubs and wind-breaks, they may come into the market for summer cottagers, campers and others seeking an outing at the seashore during the hot spells. The planting of the osier or basket-willow if found to thrive in these sands may lead to their profitable development, and thus also induce the cultivation of the osier in other places among the waste stretches of sand along the Cape. Or, if it should be found that these sands could not be sufficiently reclaimed for such a purpose, it is possible that a game preserve might be built up, and an income derived from shooting licenses at the proper seasons of the year. In the mean time, this Board are inclined to favor the granting of licenses in the form of leases with proper restrictions at reasonable rentals to such as desire to use and improve the land for a term of years.

It is recommended that at least \$3,500 be appropriated for the purpose of continuing the work. The detailed statement of the superintendent, appointed by authority of said act of 1893, in regard to operations during the year, contains a full discussion of the subject of reclamation of these lands on lines which have met our approval, and is as follows:—

To the Board of Harbor and Land Commissioners of the Commonwealth of Massachusetts.

DEAR SIRs:—As superintendent of the province lands I respectfully submit the following report for the period of eleven months, commencing Jan. 1, 1894, and ending Nov. 30, 1894.

On receiving my appointment as superintendent of the province lands I commenced the work assigned me in accordance with instructions received from your honorable Board, which were to lay out and grade a section of road through the lands to make it reasonably accessible to people desiring to visit them, and to devise the best methods of preventing the shifting of sand, which is the chief difficulty to be overcome in the process of reclaiming these lands.

The territory to be reclaimed consists of three ranges of

sand hills, running north-easterly and south-westerly, and about one mile in extent each, with the north-westerly exposures entirely void of all vegetation; the south-easterly slopes and the valleys between these ranges of hills are mostly covered with beach grass, bayberry brush, cranberry vines, etc. The prevailing winds which do the most damage are from the north-west, and are the winds which, in the process of reclaiming this territory, we shall have to fight against.

The sand of which these ranges are composed seems to be of disintegrated granite, flinty and sharp, and, when moved by the fierce winds of winter, cuts and destroys much of the vegetation with which it comes in contact; to stop the shifting sands, which move like drifting snow, and cover these barren sections with a vegetable growth, is the chief work, and most difficult, to be accomplished.

The first work in which I engaged upon receiving my appointment was the laying out and grading a road twenty feet wide, commencing near Bound I, as shown on the chart, and extending in a north-westerly direction to Nigger Head, a distance of about thirty-one hundred feet. This route was selected for the reason that this section of the lands is better protected from the shifting sands, extends farther into the territory to be reclaimed than any other. . . . This section of road was completed early in April, and it has been much used during the season. . . . The material used for hardening this section of road was the turf taken from the adjacent woods, which makes a comparatively fair driveway.

In addition to this road work, about one hundred dollars have been expended in trimming and repairing the old roads through the wooded portion of the lands, to make them convenient and safe for public travel.

In the month of April I proceeded with planting operations. It was decided to begin at the foot of the north-western slope of the most northern range of hills, opposite Nigger Head, and proceed south-westerly with the work along the foot of the slope. The selection of trees and shrubs was decided after consultation with parties who have had experience in work of this kind, and it was concluded that the *Genista scoparia* or Scotch broom, poplars and wil-

lows of various kinds, met the requirements of the situation as well as any available; and accordingly ten thousand of the Scotch broom, imported from France especially for this work, about eight thousand willows, about twelve hundred poplars and two hundred European larch were planted in the section designated, covering about eight acres.

The result of this work has not been so successful and satisfactory as was anticipated, from the fact that conditions during the whole season have been extremely unfavorable for growing young plants, the weather having been extremely hot and dry. According to the most reliable record obtainable, no conditions of weather so unfavorable for work of this kind have prevailed for a period of more than twenty years. Notwithstanding, a fair average percentage of the plants have survived. Of the willows ninety-five per cent., poplars eighty-five per cent., were alive October 10, but had not shown large growth. Of the Scotch broom only about ten per cent. were living, but these have shown very satisfactory growth, and seem to show adaptation to the soil if once fairly started. . . . Of the European larch none survived; a few other varieties were planted, but with no very favorable results.

In addition to this early spring planting, during the months of September, October and November a section of about eight acres, extending along this same slope in a south-westerly direction, has been covered with young pines, maples, birch and other indigenous trees, taken from the wooded portion of the province lands. I have also sown about four acres with *Genista* seed. Of the result of this experiment of fall planting it is impossible to judge until the opening of another season. Of the varieties planted, about twenty-five thousand are young pines from two to five years' growth; and about twenty-five hundred are oaks, maples, birch, beech and several kinds of berry-bearing plants.

I apprehend no trouble in making any of these various kinds of trees grow in this seemingly sterile land, under ordinarily favorable conditions of weather, if the sands can be kept from shifting during the fall and winter months. The heavy winds move the sand like snow, and by reason of its sharp and flinty nature it cuts the bark of tree and shrub and

kills them ; and the process of reclaiming this waste territory must of necessity be slow, as the trees and shrubs must be somewhat protected until they form a growth sufficient to be self-protecting. As a measure of protection to the plants already set out, I have carted a large quantity of brush taken from Nigger Head and placed it in such a way as to protect the plants on their most exposed sides, and help them to withstand the effects of the drifting sands. The brush carted was taken from the line of the proposed roadway through Nigger Head, a strip of wood about half a mile in length, thereby serving two objects, — that of clearing the roadway, and at the same time utilizing the material for the protection of the plants.

For the purpose of furnishing a supply of plants, to be used in reclaiming these lands, I have prepared a parcel of land in a sheltered portion of the territory as a nursery, and planted the same with Scotch broom seed. I propose planting pine and other seeds for the same object, the young plants from which will be transplanted as they shall become of suitable growth.

I received from Leonard W. Ross & Co. something over two thousand willows of various kinds, as per contract made by your Board, and had the same "heeled in" in a sheltered spot, with the expectation of using them for transplanting early in the coming spring.

I am of the opinion that much may be accomplished by covering some of the barren territory with beach grass, and systematic work in that line in connection with the tree planting will result in much good ; considerable quantities of the grass are available for transplanting, within the lands.

The work to be done is of considerable magnitude, and what has been done thus far in the line of planting is experimental ; yet I have strong faith that good results will follow, and that time and liberal appropriations judiciously expended will convert the seemingly sterile sands of the province lands into a valuable public reserve, from which much pleasure as well as profit in the future may be enjoyed by the people of the Commonwealth.

There has been expended up to date a total of, . . . \$1,861 26

Which may be divided as follows:—

For road work,	\$1,143 13
For planting operations,	568 25
For tools and tool house,	114 73
For travelling expenses, stationery, carriage hire, etc.,	35 15
	————— \$1,861 26

Respectfully submitted,

JAMES A. SMALL,

Superintendent Province Lands.

PROVINCETOWN, MASS., Dec. 1, 1894.

LICENSES GRANTED DURING THE YEAR.

- Nos.
1621. Petition of the Boston Real Estate Trust for license to build a sea wall and fill solid in Boston harbor in the city of Boston. Granted Dec. 8, 1893.
1622. Petition of D. H. J. Holmes and others for license to excavate a canal and build jetties and a dike in East Bay in the town of Barnstable. Granted Dec. 12, 1893.
1623. Petition of the Board of County Commissioners of Bristol County for approval of plans for a bridge across the East Branch of Westport River in the town of Westport, as authorized and required by chapter 125 of the Acts of 1893. Granted Dec. 20, 1893.
1624. Petition of the Quincy and Nantasket Steamboat Company for license to build a pile wharf and dredge a channel in Boston harbor in the town of Hull. Granted Dec. 28, 1893.
1625. Petition of the city of Salem for license to construct a dolphin on South River in said city. Granted Dec. 28, 1893.
1626. Petition of H. and R. Atwood and D. Atwood & Co. for license to build and maintain a wooden building, on piles, to build a bulkhead and fill solid, and to maintain oyster floats, on Duck Creek in the town of Wellfleet. Granted Dec. 29, 1893.
1627. Petition of the firm of Nay & Ellis for license to build a pile pier on Chelsea Creek, adjoining Meridian Street bridge in East Boston. Granted Jan. 3, 1894.
1628. Petition of the city of Boston for license to rebuild Chelsea Street bridge on Chelsea Creek in the cities of Boston and Chelsea. Granted Jan. 4, 1894.

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- No.
1629. Petition of the firm of Wright & Willis for license to build and maintain a wooden building, on piles, a pile platform and oyster float, and to build a bulkhead and fill solid, on Duck Creek in the town of Wellfleet. Granted Jan. 9, 1894.
 1630. Petition of R. R. Higgins & Co. for license to build and maintain a wooden building, on piles, to build a bulkhead and fill solid, and to maintain an oyster float, on Duck Creek in the town of Wellfleet. Granted Jan. 12, 1894.
 1631. Petition of the Union Freight Railroad Company for license to dump snow and ice into a dock on Charles River in the city of Boston. Granted Jan. 16, 1894.
 1632. Petition of James D. Taber for license to build and maintain a pile wharf and float-stage in Quincy Bay, at Hough's Neck in the city of Quincy. Granted Jan. 23, 1894.
 1633. Petition of James Mears for license to build and maintain a pile wharf and float-stage in Quincy Bay, at Hough's Neck in the city of Quincy. Granted Feb. 26, 1894.
 1634. Petition of John F. Randall for license to build a pile wharf in Boston harbor at East Boston. Granted Feb. 26, 1894.
 1635. Petition of the Boston & Maine Railroad for license to build stone piers and pile platforms on the north and south channels of Mystic River, at Chelsea bridge in the city of Boston. Granted Feb. 26, 1894.
 1636. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for a sewer and siphon across Malden River in the cities of Everett and Malden, as authorized by chapter 439 of the Acts of 1889. Granted Feb. 26, 1894.
 1637. Petition of the Boston Asylum and Farm School for Indigent Boys for license to lay a cable and erect poles in Boston harbor, between Squantum and Thompson's Island in the city of Boston. Granted Feb. 26, 1894.
 1638. Petition of the Nantasket Beach Steamboat Company for license to build a wharf, partly solid and partly on piles, in Hull Bay in the town of Hull. Granted Feb. 26, 1894.
 1639. Petition of Henry M. Whitney for license to fill solid on Charles River in the city of Cambridge. Granted March 7, 1894.
 1640. Petition of the city of Cambridge for license to build a

Nos.

sewer and siphon and fill solid on Charles River in said city. Granted March 7, 1894.

1641. Petition of Henry Gardner and others for license to build a dam and flume at Moon Pond in the town of Truro, to excavate a canal, and draw water from said pond. Granted March 7, 1894.
1642. Petition of the heirs of Nelson Shumway for license to fill solid a portion of their wharf on Fort Point Channel in the city of Boston. Granted March 9, 1894.
1643. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to fill solid its bridge in Boston harbor, at Orient Heights in East Boston. Granted March 14, 1894.
1644. Petition of John Duff for license to build a stone and timber bulkhead and fill solid in New Bedford harbor, at Fish Island in the city of New Bedford. Granted March 28, 1894.
1645. Petition of the Nantasket Beach Steamboat Company for license to extend its wharf, on piles, in Hingham harbor in the town of Hingham. Granted March 28, 1894.
1646. Petition of George W. Pitman and others for license to widen their wharf by filling solid in Salem harbor in the city of Salem. Granted March 28, 1894.
1647. Petition of Ruth M. P. Copeland for license to widen and extend her wharf in Salem harbor in the city of Salem. Granted March 28, 1894.
1648. Petition of Marshall Lincoln for license to build and maintain a boat-house, pile wharf and float-stage, and to excavate a channel, in Hingham harbor in the town of Hingham. Granted April 4, 1894.
1649. Petition of Charles I. Litchfield and Henry H. Litchfield for license to widen Long wharf, on piles, in Plymouth harbor in the town of Plymouth. Granted April 4, 1894.
1650. Petition of the National Dock and Warehouse Company for license to build a sea wall and pile platform and fill solid a portion of its dock in Boston harbor at East Boston. Granted April 12, 1894.
1651. Petition of Oliver C. Grinnell for license to locate and maintain a mooring and drive three stakes in Wood's Holl Great Harbor, at Wood's Holl in the town of Falmouth. Granted April 12, 1894.
1652. Petition of Edward S. Wood for license to build and main-

Nos.

- tain a pile pier, wall and float-stage, in Pocasset harbor in the town of Bourne. Granted April 12, 1894.
1653. Petition of the Quincy & Boston Street Railway Company for license to extend its wharf, on piles, and to dredge a basin, on Weymouth Fore River in the city of Quincy. Granted April 12, 1894.
1654. Petition of the Board of County Commissioners of Barnstable County for approval of plans for an earthwork structure across Wading Place Creek in the towns of Harwich and Chatham, as authorized by chapter 37 of the Acts of 1894. Granted April 17, 1894.
1655. Petition of the Lincoln Boat Club for license to build a boat-house in Sandy Pond in the town of Lincoln. Granted April 17, 1894.
1656. Petition of Albin M. Richards for license to fill solid on Mystic River in the city of Boston. Granted April 24, 1894.
1657. Petition of William M. Randall for license to build a pile wharf in Vineyard Haven harbor in the town of Tisbury. Granted April 24, 1894.
1658. Petition of the Board of County Commissioners of Bristol County for license to construct fender-piers at the highway bridge over the East Branch of Westport River in the town of Westport. Granted April 24, 1894.
1659. Petition of the town of Marblehead for license to build a wharf in Marblehead harbor in said town. Granted April 24, 1894.
1660. Petition of Horace S. Crowell for license to locate and maintain a float-stage in Wood's Holl Great Harbor, at Wood's Holl in the town of Falmouth. Granted April 26, 1894.
1661. Petition of Emma J. Ferris for license to build and maintain a boat-house and float-stage in Wood's Holl Great Harbor, at Wood's Holl in the town of Falmouth. Granted April 26, 1894.
1662. Petition of Nelson Huckins for license to build a pile wharf in Onset Bay in the town of Wareham. Granted April 30, 1894.
1663. Petition of Alvarado A. Coburn for license to build a stone and timber wharf in Lake Whalom in the town of Lunenburg. Granted May 1, 1894.
1664. Petition of Augusta DeWolf for license to build a bulkhead and fill solid in Boston harbor at East Boston. Granted May 1, 1894.

Nos.

1665. Petition of William Power Wilson for license to build and maintain a pile pier and float stage in Red Brook harbor in the town of Bourne. Granted May 3, 1894.
1666. Petition of George V. Williams for license to build and maintain a building and platform, on piles, to fill solid, and to locate and maintain an oyster float, on Duck Creek in the town of Wellfleet. Granted May 9, 1894.
1667. Petition of Richard C. Sibley for license to rebuild, extend and widen Slate wharf, and to dredge a berth for vessels in front of said wharf, in Boston harbor in the city of Boston. Granted May 28, 1894.
1668. Petition of the Boston Forge Company for license to extend its wharf, partly solid and partly on piles, in Boston harbor at East Boston. Granted June 6, 1894.
1669. Petition of James Gifford for license to construct and maintain a wooden box drain in Provincetown harbor in the town of Provincetown. Granted June 13, 1894.
1670. Petition of the town of Ipswich for license to build a stone arch bridge across Ipswich River, at Green Street in said town. Granted June 13, 1894.
1671. Petition of the Bunker Hill Yacht Club for license to build and maintain a club-house, on piles, and to locate and maintain a float-stage, on Mystic River near the south draw of Chelsea bridge in the city of Boston. Granted June 19, 1894.
1672. Petition of Edgar Harding for license to build and maintain a boat-landing and float-stage in Wood's Holl Great Harbor, at Wood's Holl in the town of Falmouth. Granted June 28, 1894.
1673. Petition of Thomas B. Wales and others for license to build a sea wall and fill solid on Fort Point Channel in the city of Boston. Granted June 28, 1894.
1674. Petition of the town of Falmouth for approval of plans for a bridge across a creek running into Chappaquoit harbor in said town, as authorized by chapter 69 of the Acts of 1894. Granted July 3, 1894.
1675. Petition of Pardon A. Tripp for license to build and maintain a boat mooring in the East Branch of Westport River in the town of Westport. Granted July 3, 1894.
1676. Petition of Andrew H. Sowle for license to build and maintain a boat mooring in the East Branch of Westport River in the town of Westport. Granted July 3, 1894.
1677. Petition of the Boston & Maine Railroad for license to

Nos.

- rebuild and repair a portion of its eastern division bridge on Charles River in the cities of Boston and Cambridge. Granted July 6, 1894.
1678. Petition of Winchester Smith for license to fill solid his pile wharves on South River in the city of Salem. Granted July 6, 1894.
1679. Petition of Albin M. Richards for license to widen a portion of his wharf, on piles, on Mystic River in the city of Boston. Granted July 9, 1894.
1680. Petition of the city of Cambridge for license to build a bulkhead and fill solid on Charles River in said city. Granted July 9, 1894.
1681. Petition of Fannie L. Chase for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1682. Petition of Augustin Bourneuf for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1683. Petition of the heirs of Edwin Bowley for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1684. Petition of George A. Hall for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1685. Petition of James McBride for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1686. Petition of the city of Haverhill for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1687. Petition of George C. Elliott for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1688. Petition of Levi L. H. Taylor and Ezra W. B. Taylor for license to build a sea wall or bulkhead and fill solid on Merrimac River in the city of Haverhill. Granted July 12, 1894.
1689. Petition of Charles A. Pardee and John M. Young for license to widen and extend their wharf, partly solid and partly on piles, on Taunton River in the city of Fall River. Granted July 13, 1894.
1691. Petition of William T. Briggs for license to build a pile wharf in Wood's Holl Little Harbor, at Wood's Holl in the town of Falmouth. Granted July 18, 1894.

Nos.

1692. Petition of Charles H. Souther for license to fill solid on Charles River in the city of Cambridge. Granted July 18, 1894.
1693. Petition of Oliver Ames, 2d, and Samuel Carr, for license to fill solid on Charles River in the city of Cambridge. Granted July 18, 1894.
1694. Petition of the Boston & Albany Railroad Company for license to repair its bridge on its grand junction branch on Charles River in the cities of Boston and Cambridge. Granted July 18, 1894.
1695. Petition of Linus M. Child for license to build and maintain a pile structure in Winthrop harbor in the town of Winthrop. Granted July 19, 1894.
1696. Petition of the Board of County Commissioners of Essex County for approval of plans for fenders at the Haverhill bridge on Merrimac River, as authorized by chapter 125 of the Acts of 1894. Granted Aug. 1, 1894.
1697. Petition of Oscar Dubois for license to build and maintain a pile wharf in Mount Hope Bay in the city of Fall River. Granted Aug. 1, 1894.
1698. Petition of the Standard Oil Company of New York for license to lay and maintain a six-inch iron pipe in Mount Hope Bay in the city of Fall River. Granted Aug. 1, 1894.
1699. Petition of Arthur D. Veasey and Benjamin P. Hale for license to extend their wharf, on piles, on Merrimac River in the town of Groveland. Granted Aug. 1, 1894.
1700. Petition of the Boston & Albany Railroad Company for license to repair its bridge on its grand junction branch on Mystic River in the city of Everett. Granted Aug. 1, 1894.
1701. Petition of the city of Taunton for approval of plans for a dam and other works in Assawompset Pond and Elder's Pond in the towns of Lakeville and Middleborough, as authorized by chapter 217 of the Acts of 1875 and chapter 402 of the Acts of 1893. Granted Sept. 5, 1894.
1702. Petition of the Board of County Commissioners of Essex County for approval of plans for a new abutment and pier at Rocks Bridge on Merrimac River, as authorized and required by chapter 421 of the Acts of 1894. Granted Sept. 5, 1894.
1703. Petition of White, Holman & Co. for license to fill solid

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Nos.

- on Chelsea Creek in the city of Chelsea. Granted Sept. 5, 1894.
1704. Petition of John Stetson for license to build and maintain a boat landing in Burgess Cove in the town of Beverly. Granted Sept. 13, 1894.
1705. Petition of the Boston & Albany Railroad Company for license to repair its Pier No. 4 in Boston harbor at East Boston. Granted Sept. 13, 1894.
1706. Petition of the town of Marblehead for license to build a pile and timber sewer in Marblehead harbor in said town. Granted Sept. 13, 1894.
1707. Petition of Samuel Cabot for license to widen and repair his wharf and construct a dolphin on Chelsea Creek in the city of Chelsea. Granted Sept. 13, 1894.
1708. Petition of the town of Marblehead for license to build a wharf in Marblehead harbor in said town. Granted Sept. 13, 1894.
1709. Petition of Patrick Meehan for license to build stone piers in Buzzard's Bay in the town of Falmouth. Granted Sept. 13, 1894.
1710. Petition of the town of Winthrop for license to fill solid the pile portion of Washington Avenue bridge across Crystal Cove in said town. Granted Sept. 19, 1894.
1711. Petition of the city of Somerville for license to build a sewer outlet on Mystic River in said city. Granted Sept. 19, 1894.
1712. Petition of the Boston & Albany Railroad Company for license to repair its Pier No. 6 in Boston harbor at East Boston. Granted Sept. 20, 1894.
1713. Petition of the West End Street Railway Company for license to build a pile wharf on Chelsea Creek at East Boston. Granted Sept. 20, 1894.
1714. Petition of Albert Metcalf for license to fill solid on Mystic River in the city of Boston. Granted Sept. 21, 1894.
1715. Petition of the Brookline Gas Light Company for license to build a sea wall and bulkhead and fill solid on Charles River in the city of Boston. Granted Sept. 21, 1894.
1716. Petition of Charles H. Burns for license to fill solid on Mystic River in the city of Boston. Granted Sept. 26, 1894.
1717. Petition of Albin M. Richards for license to fill solid and build a pile platform on Mystic River in the city of Boston. Granted Sept. 26, 1894.

Nos.

1718. Petition of the city of Boston for license to build a new drop at the East Boston landing of the north ferry in Boston harbor. Granted Sept. 28, 1894.
1719. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for a siphon across Mystic River in the cities of Medford and Somerville, as authorized by chapter 439 of the Acts of 1889. Granted Sept. 28, 1894.
1720. Petition of the Boston & Maine Railroad for license to rebuild the draw-pier on the north-westerly side of its eastern division bridge on Mystic River in the city of Somerville. Granted Sept. 28, 1894.
1721. Petition of the New England Dredging Company for license to build a temporary pile structure, to facilitate the filling of flats on Charles River in the city of Cambridge. Granted Oct. 2, 1894.
1722. Petition of Nannie R. Rice for license to build a wharf in Sippican harbor, at Ram Island in the town of Marion. Granted Oct. 2, 1894.
1723. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to rebuild and enlarge its terminus and to dredge in Boston harbor at East Boston. Granted Oct. 22, 1894.
1724. Petition of Edward B. Lane for license to build a sea wall and fill solid on South River in the city of Salem. Granted Oct. 23, 1894.
1725. Petition of the Menemsha Clay Company for license to build a wharf in Menemsha Bight in the town of Gay Head. Granted Oct. 30, 1894.
1726. Petition of the Beaver Dam Cranberry Bog Company for license to construct a dam and flume at Fresh Pond in the town of Plymouth, to excavate a canal, and draw water from said pond. Granted Nov. 13, 1894.
1727. Petition of Hermon E. Hibbard for license to build and maintain a pile wharf and float stage in Wood's Holl Great Harbor, at Wood's Holl in the town of Falmouth. Granted Nov. 13, 1894.
1728. Petition of Henry M. Whitney for license to fill solid on Charles River in the city of Cambridge. Granted Nov. 13, 1894.
1729. Petition of the West End Street Railway Company for license to dump snow and ice from bridges and wharves into Boston harbor. Granted Nov. 23, 1894.

Of the above licenses, Nos. 1621, 1635, 1642, 1667, 1673, 1703, 1717 and 1723 authorize solid filling beyond the United States bulkhead lines, and were granted subject to the approval of the Secretary of War.

MISCELLANEOUS PERMITS.

The Board has granted during the year twenty-two miscellaneous permits, in addition to the licenses for structures in tide waters and great ponds previously mentioned. These permits were for dredging; for the removal of material from certain beaches; for dumping material dredged from certain localities; for placing buoys in the reserved channel at South Boston; for erecting telephone poles on the Commonwealth's land at South Boston; and for authorizing the publication of a notice by the Boston & Maine Railroad, in the name of the Board, for closing Charles River to the passage of vessels through the draws in its eastern and southern division bridges during the execution of the work of rebuilding and widening the draws in said bridges under license from the Board.

TIDE-WATER ASSESSMENTS AND HARBOR COMPENSATION FUND.

There was paid into the treasury of the Commonwealth during the year, under section 14 of chapter 19 of the Public Statutes, \$3,501.74, in payment for tide water displaced by work done under licenses granted by the Board, and this amount was credited to the harbor compensation fund.

Under chapter 77 of the Resolves of 1894 there was paid from this fund, by the treasurer of the Commonwealth, to Mary Waterman, executrix of the will of Anthony Waterman, the sum of \$1,229.50, being the amount of an assessment made by the Board for tide water displaced by the construction of a wharf on Mystic River, under a license granted by the Board June 16, 1887. The assessment paid by said Anthony was under the resolve reimbursed to his executrix on the ground that his title to the land filled under the license had failed.

The total expenditure from the fund during the past

twenty years has been \$155,653.42, of which \$125,472.28 has been for dredging, most of which has been done in the upper harbor.

RECEIPTS FROM GRANTS OF PUBLIC LANDS.

There was paid into the treasury of the Commonwealth during the year, under the provisions of section 16 of chapter 19 of the Public Statutes and chapter 318 of the Acts of 1888, for grants of rights and privileges in tide waters and great ponds under licenses from the Board, the sum of \$6,412.70. Payment for grants of tide-water lands of the Commonwealth was first required by chapter 284 of the Acts of 1874, and since the passage of that act the total amount received and paid into the treasury of the Commonwealth is \$379,052.03. In addition to the payments above mentioned, \$50 was paid as rent for Hangman's Island. The amount received during the year from rents of the Commonwealth's lands at South Boston, and paid into the Commonwealth's flats improvement fund, is \$3,711.40, as already stated.

WORK OF THE UNITED STATES IN HARBORS OF THE COMMONWEALTH.

The Board takes pleasure in appending to this report statements made by Lieut.-Col. Samuel M. Mansfield, Corps of Engineers, U.S.A., who is in charge of river and harbor improvements in eastern Massachusetts; and by Capt. Wm. H. Bixby, Corps of Engineers, U.S.A., who is in charge of similar improvements in southern Massachusetts; being the work accomplished by the United States government in the rivers and harbors of this Commonwealth during the year.

The foregoing report is respectfully submitted by

WOODWARD EMERY,
JOHN I. BAKER,
CHARLES H. HOWLAND,

Commissioners.

STATEMENT

OF

LIEUT.-COL. S. M. MANSFIELD, CORPS OF ENGINEERS, U. S. A.

[Referred to in the foregoing report of the Board.]

DEC. 3, 1894.

*The Harbor and Land Commissioners, Commonwealth of Massachusetts,
Boston, Mass.*

GENTLEMEN:—In accordance with your request of this date, 1894, I have the honor to furnish the following summary of the work done by the government during the year 1894, in those rivers and harbors of Massachusetts which are under my charge:—

1. Newburyport Harbor.

The project for the improvement of the harbor has not been changed.

No work has been done during the year on the south jetty or Plum Island dike.

Operations under the contract with Mr. George Willett Andrews, which was in force at the commencement of the year, were completed in June, 1894. A total of 14,444 tons of rubble-stone were deposited in the north jetty under this contract, and the north jetty is now 2,705 feet long, fully completed.

The annual survey of the bar was made in June, 1894. No essential change in the condition of the channel was found; its outer end had swung still farther to the southward. To counteract this movement it is proposed to expend the funds available for this improvement, under a contract with the Rockport Granite Company, in extending the south jetty. This work will be commenced early next season.

2. Harbor of Refuge, Sandy Bay.

No change in the project was made during the year.

During the year the contract with the Rockport and Pigeon Hill granite companies was completed. Under this contract 126,827

tons of stone were deposited in the breakwater below low water, and 13,448 tons above low water; 500 feet of the breakwater are completed, and in addition 4,000 feet well advanced.

A contract is in force with the Cape Ann Granite Company to deposit 240,000 tons of stone in the breakwater below mean low water.

3. *Gloucester Harbor.*

The project for the improvement of the harbor remains unchanged.

During the year 549 cubic yards of ledge were removed from Harbor Cove and the inner harbor, under a contract with Messrs. Townsend & Johnston, thus completing the project for the improvement of the harbor, except building the Eastern Point breakwater.

A contract is in force with the Rockport Granite Company to deposit 57,000 tons of stone in the Eastern Point breakwater, and operations under this contract have been commenced.

4. *Manchester Harbor.*

No change has been made in the project of improvement.

During the year the contract with Mr. Edgar P. Lovering was completed, and the improved channel is 60 feet wide, 4 feet deep, 4,000 feet long, or as proposed by the project.

5. *Salem Harbor.*

The project of improvement is unaltered.

Under a contract with Mr. Augustus R. Wright, the project was completed during the year.

The improved channel is 300 feet wide at its entrance, 150 feet wide at Derby Wharf Light, 100 feet wide to near the inner end of Derby wharf, and to this point 8 feet deep at mean low water; above, it is 50 feet wide and 6 feet deep.

A survey of the harbor is in progress, on which to base additional improvements.

6. *Lynn Harbor.*

No change has been made in the project.

No operations were in progress during the year, and the improvement is in the same condition as at the date of the last report.

7. *Winthrop Harbor.*

No operations during the year.

The project is completed.

8. *Boston Harbor.*

No change was made during the year in the project for the improvement of this harbor.

Operations under the contract with Mr. Charles H. Souther and Mr. Augustus R. Wright were continued during the year, and the contract is essentially completed. The improved channel is 1,000 feet wide from its entrance near the outer light to Bug Light, and between Bug Light and George's Island 800 feet wide ; 27 feet deep at mean low water, except over the ledges uncovered by the dredging. These ledges aggregate nearly 9,000 cubic yards, and a contract for their removal is in force with Messrs. Townsend & Johnston. Operations will be commenced under this contract immediately.

The improvement of the Nantasket Beach channel was completed ; it is now 150 feet wide, 12 feet deep at mean low water.

9. *Hingham Harbor.*

No change during the year.

10. *Scituate Harbor.*

A contract was entered into with the Pigeon Hill Granite Company to deposit 9,500 tons of rubble-stone in the south jetty. Operations under this contract will be commenced immediately.

11. *Plymouth Harbor.*

No change during the year.

12. *Kingston Harbor.*

No change during the year.

13. *Wellfleet Harbor.*

No change during the year.

14. *Provincetown Harbor.*

No change during the year.

15. *Chatham Harbor.*

No change during the year.

16. *Essex River.*

A contract was entered into with the Columbian Dredging Company to dredge 47,000 cubic yards from this river. Operations were commenced under this contract in October, 1894, but were suspended for the season early in November ; and the condition of the improvement is essentially unaltered.

17. Merrimac River.

No change during the year.

The available funds will be expended in making a survey from the mouth to Haverhill, on which to base a project for additional improvements.

18. Powow River.

A contract was entered into with Mr. Augustus R. Wright to dredge 64,000 cubic yards from this river. Operations under this contract will be commenced early in the spring.

19. Ipswich River.

The present project for the improvement of this river was completed during the year under a contract with Mr. Edgar P. Lovering. Four feet draft at mean low water can now be carried to the head of navigation, in a channel 60 feet wide.

20. Weymouth River.

A contract was entered into with Messrs. Perkins & White to dredge 37,000 cubic yards from this river. Operations under this contract will be commenced in the spring.

21. Mystic and Malden Rivers.

A contract was entered into with Mr. Chas. H. Souther to dredge 75,000 cubic yards from these rivers. Operations under this contract will be commenced in the spring.

22. Removal of Wrecks.

During the year the following wrecks were removed:—

By a contract with Mr. D. A. Johnston, the schooner "Wild fire" from Provincetown harbor.

Under a contract with Messrs. Townsend & Johnston, an unknown schooner from off Chatham, Mass.

By hired labor, the steamer "Perit" from Chatham bar, Mass.

By a contract with Mr. Geo. W. Townsend, the schooner "Ocean Eagle" from off Newburyport, Mass.

23. Examinations and Surveys.

Preliminary examinations were made of the harbors at Manchester, Plymouth and Chatham New Inlet.

Projects for the improvement of Chelsea Creek and East Boston Channel have been prepared.

Very respectfully, your obedient servant,

S. M. MANSFIELD,
Lieutenant-Colonel of Engineers.

STATEMENT

OF

CAPT. W. H. BIXBY, CORPS OF ENGINEERS, U. S. A.

[Referred to in the foregoing report of the Board.]

Abstract of work of river and harbor improvement done in the State of Massachusetts by the United States government, under direction of Capt. Wm. H. Bixby, Corps of Engineers, for the fiscal year ending June 30, 1894. (For the approved projects of each work, see the Harbor and Land Commissioners' Report for 1893.)

1. Taunton River.

Nothing was done, because of lack of appropriations.

There remain to complete the existing project the widening and deepening of the channel at a few points, and the removal of a small amount of ledge rock.

2. Hyannis Harbor.

Dredging was commenced by the contractor at this place in April, and completed on June 8, 1894; by which 21,880 cubic yards of sand were removed from 10,545 feet length and 25 feet width of cutting and to 15.5 feet depth at low water, resulting in an addition of about 6.1 acres to the anchorage basin, which now covers about 65 acres. Further dredging must await further appropriations.

The work required to complete the existing project is the completion of the dredging to a depth of 15½ feet over 16 acres more, in the area limited on the west by a line running due north from the western end of the breakwater and on the north by a line running parallel to the breakwater, and distant 500 feet from it, leaving a berm of 100 feet along its northern side.

3. *Nantucket Harbor.*

During the year general preparations and repair of plant, including overhauling of jetty light, and later the replacing of both the lantern and staff, which during the past winter had been carried away by ice and lost.

Informal bids for placing stone in the jetties were received, and contract entered into with Messrs. S. & E. S. Belden of Hartford, Conn., under date of April 16 (approved by the chief of engineers on April 21), at \$1.85 per ton of 2,000 pounds in place in the east jetty, and \$2 per ton of 2,000 pounds in place in the west jetty; work to be commenced on or before June 30, and completed on or before Dec. 31, 1894. Work was actually commenced by the contractor on May 30, and was in progress at the end of the year; 825 tons of core stone and 590 tons of facing stone being placed in the east jetty, thereby extending it by 420 feet; and 575 tons of facing stone being placed on the west jetty, thereby leveling it up to about 100 feet from the shore end. The east jetty is now 2,554 feet long, and the west jetty 3,955 feet long.

A light has been maintained on the west jetty during the year.

The work required to complete the existing project is the extension of the east jetty, the raising of the west jetty in some places, and the excavation by dredging of so much of the channel as may not be excavated by tidal scour.

4. *Edgartown Harbor.*

Nothing was done, because of lack of appropriations.

The work required to complete the existing project is the excavation of the remaining quarter of the middle ground to a depth of 10 feet at mean low water.

5. *Vineyard Haven Harbor.*

Work at this place consists in protecting the bluff ends of the Chops from further wear by the ocean currents and storm waves.

Work was commenced by the contractor in August and continued until December, when stopped on account of the severe winter weather; by which 608 tons of heavy stone and 467 tons of light stone were placed in position in about 800 feet length of sea walls and jetties at the West Chop, completing such work at this Chop for the present; and 386 tons of heavy stone and 215 tons of light stone were put in position in about 600 feet length of sea wall and jetties at the East Chop.

The land on the end of the West Chop having been thus pro-

tected from further wear, the West Chop Land Company is now suing the United States for damages to their land because of the erection of such works of protection ; consequently further work at that place has been suspended.

The work required to complete the existing project is the extension of the sea walls at both Chops.

6. *Wareham Harbor.*

Dredging by the government plant, in progress at commencement of year, was continued until August, 1893, when stopped by exhaustion of funds ; by which 35,874 cubic yards of mud, 1,972 yards of sand, stone and gravel, and 4 cubic yards of bowlders were removed from 6,118 feet length and 33 to 40 feet width of cutting, and to at least 10 feet depth at low water.

Further dredging awaits further appropriations.

The project is practically completed.

7. *New Bedford Harbor.*

Dredging was commenced by the contractor in October and completed in March, 1894 ; by which 31,411 cubic yards of material was removed from 9,690 feet length and 25 feet width of cutting and to 18 feet depth at low water, thus completing the 18 feet depth channel from deep water above Palmer's Island to the vicinity of the wharves of New Bedford, and to its full width of about 200 feet.

Further dredging awaits further appropriations.

The work required to complete the existing project is the widening of the channel from Palmer's Island to the 11 foot bank, and the removal of a few shoal spots between the 11 foot bank and the Butler flats, the southern end of the projected channel.

8. *Canapitsit Channel.*

Nothing was done, because of lack of appropriations.

The work yet to be done is to deepen the 66 feet width channel by about 1 foot (that is, to 6 feet total depth), and the remaining 83 to 283 feet width of channel by about 2 feet (that is, to about 5 feet total depth).

9. *Wrecks.*

During the last fiscal year the following wrecks were removed so as to no longer obstruct navigation : —

"Ocean Traveller," a schooner of 300 tons gross tonnage, from outside of Monomoy Point, southern end of Cape Cod, Mass.

"Nellie V. Rokes," a schooner of 296 tons gross tonnage, from

a short distance south-east of the Chatham life-saving station, Monomoy, southern end of Cape Cod, Mass.

"Rogers," a schooner of 266 tons gross tonnage, from Handkerchief Shoals, about a mile south-west of Monomoy Point, southern end of Cape Cod, Mass.

Seven old wrecks ("R. H. Shannon," "Alma," "Julia" or "Juliette," and four others, names unknown) from Vineyard Haven harbor.

"Acacia," a schooner of 31 tons gross tonnage, from near Chatham, Mass.

"John P. Kelsey," a schooner of 170 tons gross tonnage, from south-east of the Handkerchief Light-ship and south-west of Monomoy Point Light, southern Cape Cod, Mass.

"G. M. Farnsworth," a schooner of about 100 tons gross tonnage, from Chatham Roads, Mass.

"Annie W. Akers," a schooner of 109 tons gross tonnage, from Hyannis Harbor, Mass.

"Stephen Raymond," a schooner of 33 tons gross tonnage, from Hyannis Harbor, Mass.

"Katie Mitchell," a schooner of 113 tons gross tonnage, from a bar south-west of Bass River, Mass.

"Franklin," a schooner of 295 tons gross tonnage, from Bearse's Shoal, south-east by east from Monomoy Light, southern Cape Cod, Mass.

"Laura E. Messer," a schooner of 426 tons gross tonnage, from shoals of Pollock Rip, east of Monomoy Point, Mass.

"Asa H. Pervere," a schooner of 98 tons gross tonnage, from off Monomoy Beach, Mass.

JOHN N. ...
PUBLIC ...

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the transparency and accountability of the organization. The text outlines the various methods used to collect and analyze data, ensuring that the information is reliable and up-to-date.

2. The second part of the document focuses on the implementation of the proposed changes. It details the steps involved in the process, from the initial planning stage to the final execution. The document highlights the challenges faced during the implementation and provides solutions to overcome them. It also discusses the role of the management team in ensuring the successful completion of the project.

3. The third part of the document provides a summary of the findings and conclusions. It summarizes the key points discussed in the previous sections and provides a clear overview of the results. The document concludes by emphasizing the importance of continuous monitoring and evaluation to ensure the long-term success of the project.

4. The fourth part of the document contains the references and bibliography. It lists the sources used in the research and provides a clear citation for each source. The document also includes a list of the authors and their affiliations.

5. The fifth part of the document contains the appendices. It includes additional information that is relevant to the study but is not included in the main body of the document. The appendices provide a detailed look at the data and the methods used in the study.

APPENDIX.

APPENDIX.

[A.]

[See page 22 of this report, *ante*.]

AN AGREEMENT MADE THIS THIRD DAY OF AUGUST, 1894, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND SETH PERKINS AND JOSEPH E. WHITE, BOTH OF BOSTON IN SAID COMMONWEALTH, DOING BUSINESS UNDER THE FIRM NAME OF PERKINS & WHITE, PARTIES OF THE SECOND PART.

WHEREAS, The said parties have heretofore, to wit, on the thirteenth day of June, 1893, entered into certain articles of agreement for filling with gravel portions of certain streets on the South Boston flats, which articles of agreement are referred to and made a part hereof; and

WHEREAS, Said articles of agreement provided that the work should be prosecuted vigorously in all suitable weather, and the whole work completed on or before July 1, 1894; and

WHEREAS, Said parties of the second part were unable to comply with the terms of said agreement, but were compelled to stop work, leaving the streets in an unfinished condition; and

WHEREAS, Said parties of the second part are now ready to recommence said work and to complete it;

NOW THEREFORE, It is agreed by the parties hereto that the said articles of agreement of June 13, 1893, are hereby renewed and made binding upon the parties hereto, saving and excepting only that the time for the completion of said work is hereby extended, so that the whole work shall be completed on or before April 1, 1895, and the work shall be done at the rate of not less than 7,500 cubic yards per month.

Nothing herein contained shall be so construed as to change or

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impair any of the provisions of the aforesaid articles of agreement, except so far as they are modified by the express provisions of this agreement.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereto affixed, and has also caused these presents to be approved by its Governor and Council, and the said Seth Perkins and Joseph E. White have hereunto set their hands and seals.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY, } *Harbor and*
JOHN I. BAKER, } *Land*
CHAS. H. HOWLAND, } *Commissioners.*

SETH PERKINS. [SEAL.]
J. E. WHITE. [SEAL.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, Sept. 6, 1894. Approved.

[SEAL OF THE
COMMONWEALTH.]

EDWARD F. HAMLIN,
Executive Clerk.

[B.]

[See pages 23 and 30 of this report, *ante*.]

ARTICLES OF AGREEMENT MADE THIS TWELFTH DAY OF SEPTEMBER IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FOUR, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND THE NEW ENGLAND DREDGING COMPANY, A CORPORATION DULY ESTABLISHED UNDER THE LAWS OF SAID COMMONWEALTH, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work and other things specified and described in the following specifications: For filling a portion of the South Boston flats, for deepening and improving the Reserved Channel and the entrance thereto, for dredging a channel through the bar at the mouth of Chelsea Creek, and for dredging a basin near L Street bridge in Boston Harbor, all of the same to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth:—

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to fill a portion of the South Boston flats north of Congress Street, shown by blue shading on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of a part of South Boston Flats, showing area proposed to be filled, and also portion of Reserved Channel proposed to be dredged, May, 1894. Scale, 24'55." Said plan is referred to and made a part of these specifications.

The above-described area to be filled to grade 13, and to be left upon the completion of the contract smooth and level at that grade.

All material to be deposited at such place or places within said area, and in such order, as may be prescribed by the engineer, and as may be consistent with a convenient and practicable execution of the work.

No material deposited upon the above-described area to be allowed to escape or flow upon any lands or flats outside of the retaining sea walls or bulkheads; and the party of the second part to erect such barriers as may be necessary to prevent the same.

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Special care to be taken in depositing material in the rear of sea walls and bulkheads, so as not to disturb them, and the methods of so doing to be at all times such as meet the approval of the engineer.

The amount of filling required is estimated to be about 120,000 cubic yards.

The material for said filling to be obtained by dredging a channel through the bar at the mouth of Chelsea Creek ; by deepening and extending the temporary entrance to the Reserved Channel on the South Boston flats ; by widening and deepening the present excavated channel in the Reserved Channel from the bend near Geo. Lawley & Son's yacht basin and the extension of L Street in South Boston, and by excavating a basin about two hundred and twenty-five feet wide and one thousand feet long, east of L Street bridge, and a line of the sea wall on the northerly side of the Reserved Channel.

Channel through Bar at Mouth of Chelsea Creek.

The area to be dredged is shown by red shading on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of channel to be dredged through bar at mouth of Chelsea Creek in Boston Harbor, May, 1894. Scale, 1000." Said plan is referred to and made a part of these specifications.

The above-described area to be dredged to the depth of eighteen feet below mean low water in Boston Harbor, and the banks at the edges of the excavation to be sloped back from the excavated area on an angle of two to one, the slope to be outside the shaded area.

The amount of material to be excavated is estimated to be twenty-seven thousand cubic yards, and the average cut to be about three feet.

Deepening and Extending Temporary Entrance to Reserved Channel.

The area to be dredged is shown by red shading between the points marked A and B on the above-described "Plan of a part of South Boston Flats."

This area to be dredged to the depth of twelve feet below mean low water in Boston Harbor, and the banks at the edges of the excavation to be sloped back from the excavated area on an angle of two to one, the slope to be outside the shaded area.

Widening and Deepening the Reserved Channel West of Lawley's Yacht Basin.

The dredging to be done is to deepen the existing channel between the bend opposite Geo. Lawley & Son's yacht basin and

the extension of L Street to the depth of twelve feet below mean low water; and to widen said channel on its northerly side, so that upon the completion of the work the channel shall be at least two hundred feet wide on the bottom, twelve feet deep at mean low water, and the sides shall be sloped up on an angle of two to one.

All of the above-described channel areas are to be dredged so that they shall have, when the work is completed, a depth not less than that specified below mean low water.

Excavating Basin near L Street Bridge.

The area to be dredged is bounded on the north by a line parallel with and about twenty feet northerly of the line of the sea wall on the northerly side of the Reserved Channel, southerly by a line two hundred and five feet south of and parallel with said line of said wall, westerly by a line as near as practicable to the L Street bridge, and easterly by a line in extension of the westerly line of Harrison Loring's wharf. Said area to be dredged to a depth as near as practicable to the hard bottom.

Of the material dredged as above described enough shall be used, first, to fill the area first above described, and the balance dumped on the flats east of the seventy-five-acre lot and between the basin excavated, on the line of the sea wall on the northerly side of the Reserved Channel, and the prolongation of the line of the bulkhead on the northerly side of the seventy-five-acre lot.

Said dumping to be done as compactly as possible, near to and adjoining said seventy-five-acre lot, at such places and in such manner as may be directed by the engineer.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract, without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or bowlder can be removed by dredging, or not.

The aforesaid plans and the surveys and calculations based thereon are believed to be correct; but the party of the second part must examine for itself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of the engineer to be final.

All necessary aid and materials for giving or indicating lines

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and grades to be furnished by the party of the second part; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of the engineer to be strictly observed and followed.

All of the work to be done to the satisfaction of the engineer, and with such machinery and appliances, by such methods, and in such order, as shall be approved by him, and to the acceptance of said Board.

Upon the completion of the contract, the party of the second part to remove all its plant and appliances forthwith, and to leave the premises in a condition satisfactory to the engineer.

Estimates to be made by the engineer of the amount of filling done on the first above described area up to the end of each calendar month, and payment to be made thereon of seventy-five per centum of the contract price, the remaining twenty-five per centum to be paid upon the final completion, measurement and acceptance of the whole work.

Measurements of material in the fill, made for the purpose of determining the amount of compensation due the party of the second part, to be based on the grade of the surface of the bottom before the work is begun, and the grade of the surface of the filling after the work is completed; and no allowance to be made for any settling or compression of the bottom, or for any shrinkage of the filling.

Most of the area to be filled was partially filled during the first half of the year 1893 by material dredged from the Reserved Channel and deposited by a hydraulic dredge, and the material below this filling composing the original flats in this area to a depth of about eighteen feet below mean low water was a comparatively soft mud. Bidders must take these facts into consideration in making their bids.

Preparations for the work to begin at once, and the work to begin as soon as practicable, and to be prosecuted vigorously and without intermission in all suitable weather. After September 30, 1894, not less than ten thousand cubic yards of material shall be deposited each month, excepting the months of January, February and March, and the whole work shall be completed before the first day of September, 1895.

If the party of the second part refuses or neglects to prosecute the work as aforesaid, or in any other respect fails to carry out the provisions of the contract, said Board may annul the same, and contract anew with other parties without prejudice to its claim for damages arising from the breach thereof.

The word "engineer," as used herein, means the engineer of the Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

The words "party of the second part" mean the corporation contracting to do the work, or its agent in immediate charge of the work.

The words "grade 13" mean the horizontal plane thirteen feet above mean low water in Boston Harbor, as fixed and used by the engineer in the work of improvement on the South Boston flats.

And the said party of the first part, in consideration of the performance and completion of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of forty-six cents for each cubic yard of material measured in the fill on the area first above described which has been deposited and levelled in the manner hereinbefore provided, the same to be in full compensation for all the work and other things done, furnished, performed and completed as aforesaid, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council; and the said New England Dredging Company, by Charles H. Souther, its president and treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY,	}	Harbor and
JOHN I. BAKER,		Land
CHAS. H. HOWLAND,		Commissioners.

NEW ENGLAND DREDGING COMPANY,

By CHARLES H. SOUTHER,	[SEAL OF
President and Treasurer.	NEW ENGLAND
	DREDGING CO.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, Oct. 4, 1894. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[C.]

[See page 29 of this report, *ante*.]

ARTICLES OF AGREEMENT MADE THIS SIXTH DAY OF FEBRUARY IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FOUR BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND JESSE BOYNTON OF BRISTOL IN THE STATE OF RHODE ISLAND, AND LYMAN BOYNTON OF BOSTON IN THE COMMONWEALTH OF MASSACHUSETTS, COPARTNERS, DOING BUSINESS UNDER THE FIRM NAME OF BOYNTON BROS., PARTIES OF THE SECOND PART.

The said parties of the second part hereby covenant and agree with the said party of the first part to do and complete all the work and other things specified and described in the following specifications for dredging a channel in South Bay in Boston Harbor, all of the same to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth : —

Specifications.

The parties of the second part are to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows : —

In South Bay a channel about 2,000 feet long, 10 feet deep at mean low water, 60 feet wide on the bottom, with side slopes 2 to 1, to be dredged from near the wharf of the West End Street Railway Company to near the wharf of L. G. Burnham & Co.

The location and dimensions of the channel are more exactly shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled “ Plan of proposed channel in South Bay, Boston. December, 1893. Scale, $1\frac{1}{16}$ ” Said plan is referred to and made a part of these specifications.

The amount of material to be excavated is estimated to be about 16,000 cubic yards, and the average cut to be about 3 feet.

The material excavated may be deposited on the flats which the

Roxbury Central Wharf Corporation is now authorized to fill, the consent of said corporation being first obtained, or at such other place or places as the Board of Harbor and Land Commissioners may approve.

The above-described area is to be dredged so that it shall have, when the work is completed, a depth of not less than ten feet below the plane of mean low water, and no extra payment or allowance to be made for any excavation below or outside of the required lines and grades.

All ledges and boulders which may be found, and which can be removed by dredging, to be removed as part of the contract without extra payment or allowance; but if any ledges or boulders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and boulders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or boulder can be removed by dredging or not.

The aforesaid plan and the surveys and calculations based thereon are believed to be correct; but the parties of the second part must examine for themselves, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid and materials for giving or indicating lines and grade to be furnished by the parties of the second part at their own expense; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer, or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances and by such methods as shall be approved by him, and to the acceptance of said Board:

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion; and to be fully completed on or before the first day of August, 1894.

Estimates to be made by said engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of seventy-five per centum of the proportional part of the contract price applicable to such work, as computed by said engineer, the remaining 25 per centum to be paid upon the final completion and acceptance of such work.

If the parties of the second part refuse or neglect to prosecute the work, or in any other respect fail to carry out the provisions

of the contract, said Board may annul the same, and contract anew with other parties, without prejudice to its claim for damages arising from breach thereof.

The word "engineer" as used herein, means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said parties of the second part the sum of thirty-four hundred dollars, the same to be in full therefor, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, hath caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and hath also caused these presents to be approved by its governor and council; and the said Jesse Boynton and Lyman Boynton have hereunto set their hands and seals.

THE COMMONWEALTH OF MASSACHUSETTS,

By HENRY W. SWIFT, } *Harbor and*
JOHN I. BAKER, } *Land*
} *Commissioners.*

JESSE BOYNTON. [SEAL]

LYMAN BOYNTON. [SEAL]

COMMONWEALTH OF MASSACHUSETTS.

In Council, Feb. 15, 1894 Approved.

EDWARD F. HAMLIN,
Executive Clerk.

[D.]

[See page 29 of this report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS EIGHTEENTH DAY OF APRIL, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FOUR, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND THE NEW ENGLAND DREDGING COMPANY, A CORPORATION DULY ESTABLISHED UNDER THE LAWS OF SAID COMMONWEALTH, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for excavating and improving the channel of Charles River, all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth:—

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows:—

The work to be done is to excavate three shoal places in the channel of Charles River, between West Boston bridge and the Grand Junction Railroad bridge.

The location and dimensions of the areas to be dredged are shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled, "Plan of proposed dredging in Charles River, between West Boston and Brookline bridges. December, 1893. Scale, $\frac{1}{2000}$." Said plan is referred to and made a part of these specifications.

The above-described areas to be dredged to the depth of ten feet below mean low water in Boston harbor, and the banks at the edges of the excavation to be sloped back from the excavation on an angle of two to one, the slope to be outside the shaded area.

The amount of material to be excavated is estimated to be about

twenty-four thousand cubic yards, and the average cut to be about 2.2 feet.

The material excavated is to be dumped on the flats of the Charles River Embankment Company, below Harvard bridge and south of the sea wall of said company, at such place or places and in such manner as shall be designated by the said corporation or its authorized agent.

All of the above-described areas are to be dredged so that they shall have, when the work is completed, a depth of not less than ten feet below the plane of mean low water, and no extra payment or allowance to be made for any excavation below or outside of the required lines and grades.

All ledges and boulders which may be found, and which can be removed by dredging, to be removed as part of the contract without extra payment or allowance; but if any ledges or boulders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and boulders left bare to the depth aforesaid; and the engineer of said Board to be sole judge to determine whether any ledge or boulder can be removed by dredging or not.

The aforesaid plan and the surveys and calculations based thereon are believed to be correct; but the party of the second part must examine for itself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid and materials for giving or indicating lines and grade to be furnished by the party of the second part at its own expense; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer, or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances and by such methods as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion; and to be fully completed on or before the first day of August, 1894.

Estimates to be made by said engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of seventy-five per centum of the proportional part of the contract price, as computed by said engineer, the remaining twenty-five per centum to be paid upon the final completion and acceptance of such work.

If the party of the second part refuses or neglects to prosecute the work, or in any other respect fails to carry out the provisions of the contract, said Board may annul the same, and contract anew with other parties, without prejudice to its claim for damages arising from breach thereof.

The word "engineer," as used herein, means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of sixty-four hundred and seventy-five dollars, said sum to be in full therefor, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its governor and council; and the said New England Dredging Company, by Charles H. Souther, its president and treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By HENRY W. SWIFT,	}	Harbor and
JOHN I. BAKER,		Land
CHAS. H. HOWLAND,		Commissioners.

NEW ENGLAND DREDGING COMPANY,

[SEAL OF NEW ENGLAND
DREDGING COMPANY.]

By CHARLES H. SOUTHER,
President and Treasurer.

COMMONWEALTH OF MASSACHUSETTS.

In Council, April 26, 1894. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[E.]

[See page 30 of this report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS TWENTY-FOURTH DAY OF APRIL, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FOUR, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND THE EASTERN DREDGING COMPANY, A CORPORATION ESTABLISHED UNDER THE LAWS OF THE STATE OF MAINE, AT PORTLAND IN SAID STATE, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for excavating and improving the channel of Neponset River, all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth:—

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows:—

The area to be dredged is shown by red shading on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled “Plan of shoal in Neponset River, between wharf of Putnam Nail Company and wharf of A. T. Stearns Lumber Company. August, 1891. Scale, 1000.” Said plan is referred to and made a part of these specifications.

The above-described area to be dredged to the depth of 10 feet below mean low water in Boston Harbor, and the banks at the edges of the excavation to be sloped back from the excavated area on an angle of 2 to 1, the slope to be outside the shaded area.

The amount of material to be excavated is estimated to be 21,000 cubic yards, and the average cut to be about 2.2 feet.

The excavated material may be deposited on the flats near the banks of the Neponset River, at such places as may be approved by this Board, the consent of the owner of the flats having been first obtained. All material to be dumped compactly, as near high-water line as practicable, and wholly within the bulkhead lines approved by the Secretary of War February 13, 1890; or such other disposition shall be made of the material as shall be approved by this Board.

The above-described area to be dredged so that it shall have, when the work is completed, a depth of not less than 10 feet below the plane of mean low water, and no extra payment or allowance to be made for any excavation below or outside of the required lines and grades.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan and the surveys and calculations based thereon are believed to be correct; but the party of the second part must examine for itself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid or materials for giving or indicating lines and grade to be furnished by the party of the second part at its own expense, and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer, or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion; and to be fully completed on or before the first day of August, 1894.

Estimates to be made by said engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of seventy-five per centum of the proportional part of the whole contract price applicable to such work, as computed

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by said engineer; and the remaining twenty-five per centum to be paid upon the final completion and acceptance of the whole work.

If said party of the second part refuses or neglects to prosecute the work, or in any other respect fails to carry out the provisions of the contract, said Board may annul the same, and contract anew with other parties, without prejudice to its claim for damages arising from breach thereof.

The word "engineer," as used herein, means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in the immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of \$6,365, said sum to be in full therefor, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its governor and council; and the said Eastern Dredging Company, by George E. Runyan, its treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By HENRY W. SWIFT,	}	<i>Harbor and Land Commissioners.</i>
JOHN I. BAKER,		
CHAS. H. HOWLAND,		

EASTERN DREDGING COMPANY,

By GEORGE E. RUNYAN,	[SEAL OF EASTERN DREDGING COMPANY.]
<i>Treasurer.</i>	

COMMONWEALTH OF MASSACHUSETTS.

In Council, May 10, 1894. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[F.]

[See page 30 of this report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS FOURTH DAY OF SEPTEMBER, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FOUR, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND THE EASTERN DREDGING COMPANY, A CORPORATION ESTABLISHED UNDER THE LAWS OF THE STATE OF MAINE, AT PORTLAND IN SAID STATE, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for the removal by dredging of the shoal in Boston harbor opposite the North Ferry slip and Lincoln wharf; all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth:—

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for as follows:—

The area to be dredged extends from a line drawn in extension of the southerly line of Battery wharf to a line drawn in extension of the southerly line of Lincoln wharf, and contains about 61,000 square feet; it averages about 400 feet long by 150 feet wide.

The location and dimensions of this area are more exactly shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of shoal off North Ferry slip, Boston, July, 1894. Scale, $\frac{1}{8160}$." Said plan is referred to and made a part of these specifications.

The amount of material on the above area, between the present bottom and the plane of 23 feet below mean low water, is about 8,500 cubic yards.

The least present depth of water on the above area is about 13 feet at mean low water, and the average cut is about 3.4 feet.

All of the above-described area is to be dredged so that it shall have, when the work is completed, a depth of not less than 23 feet below the plane of mean low water.

The banks at the edges of the above area to be sloped off sufficiently to maintain the required depth over the whole of said area, and no extra payment or allowance to be made for such sloping, nor for any excavation below the required depth.

The material excavated to be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Light; or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct; but the party of the second part must examine for itself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid and materials for giving or indicating lines and grade to be furnished by the party of the second part at its own expense, and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer, or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances and by such methods as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion; and to be fully completed on or before the first day of December, 1894.

Estimates to be made by said engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of seventy-five per centum of the proportional part of the contract price applicable to such work, as computed by said engineer; the remaining twenty-five per centum to be paid upon the final completion and acceptance of the whole work.

If the party of the second part refuses or neglects to prosecute

the work, or in any other respect fails to carry out the provisions of the contract, said Board may annul the same, and contract anew with other parties, without prejudice to its claim for damages arising from breach thereof.

The word "engineer," as used herein, means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

The words "party of the second part" mean the corporation contracting to do the work, or its agent in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of \$4,650, said sum to be in full therefor, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its governor and council; and the said Eastern Dredging Company, by George E. Runyan, its treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY,

JOHN I. BAKER,

CHAS. H. HOWLAND,

Harbor and Land Commissioners.

EASTERN DREDGING COMPANY,

By GEORGE E. RUNYAN,

Treasurer.

[SEAL OF THE EASTERN
DREDGING COMPANY.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, Sept. 20, 1894. Approved.

E. F. HAMLIN,

Executive Clerk.

[SEAL OF THE
COMMONWEALTH.]

[G.]

[See page 37 of this report, *ante*.]

AGREEMENT MADE THIS TWENTY-NINTH DAY OF MAY, 1894, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS AND ANTON GRAF OF GEORGETOWN IN THE COUNTY OF ESSEX AND COMMONWEALTH AFORESAID.

Said Graf hereby agrees to break up and remove the wreck of the schooner "A. Baker," now lying sunken in the tide waters of Plum Island Sound, near the southerly end of Plum Island in the town of Ipswich.

After removal, the material to be placed upon the neighboring shore above high-water mark, the consent of the owners of said shore being first obtained.

All the work to be subject to the approval and direction of the engineer of the Board of Harbor and Land Commissioners, and to the satisfaction of said Board.

The said Graf is to furnish at his own cost and expense all the plant, apparatus, materials, appliances and labor necessary for said work, and to save the Commonwealth harmless from all liability for damages to any person or property caused by or in any way arising from the carrying out of this agreement.

The said work of removal shall be begun at once, and shall be prosecuted with due diligence until completion, and shall be completed as soon as possible.

Upon the performance of this agreement by the said Graf to the satisfaction of the said Board of Harbor and Land Commissioners, said Commonwealth agrees to pay to said Graf the sum of \$195, the same to be in full satisfaction for all things furnished and done under this agreement, and for all costs and expenses incurred by him in the performance of the same.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and

delivered in its name and behalf and the same to be approved by its governor and council, and the said Anton Graf has hereunto set his hand.

THE COMMONWEALTH OF MASSACHUSETTS,

By HENRY W. SWIFT,
JOHN I. BAKER,
CHAS. H. HOWLAND,
Harbor and Land Commissioners.

ANTON GRAF.

In Council, May 31, 1894. Approved.

E. F. HAMLIN,
Executive Clerk.

[SEAL OF THE
COMMONWEALTH]

[H.]

[See page 39 of this report, *ante*.]

SECTIONS 5, 6, 7, 8 AND 9. OF THE RIVER AND HARBOR ACT OF
AUGUST, 1894.

*Be it enacted by the Senate and House of Representatives of the United
States of America in Congress assembled.*

SECT. 5. That it shall be the duty of all persons owning, operating and tending the drawbridges now built, or which may hereafter be built across the navigable rivers and other waters of the United States, to open, or cause to be opened, the draws of such bridges under such rules and regulations as in the opinion of the Secretary of War the public interests require to govern the opening of drawbridges for the passage of vessels and other water crafts, and such rules and regulations, when so made and published, shall have the force of law. Every such person who shall wilfully fail or refuse to open, or cause to be opened, the draw of any such bridge for the passage of a boat or boats, or who shall unreasonably delay the opening of said draw after reasonable signal shall have been given, as provided in such regulations, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not more than two thousand dollars nor less than one thousand dollars, or by imprisonment (in the case of a natural person) for not exceeding one year, or by both such fine and imprisonment, in the discretion of the court: *provided*, that the proper action to enforce the provisions of this section may be commenced before any commissioner, judge, or court of the United States, and such commissioner, judge, or court shall proceed in respect thereto as authorized by law in case of crimes against the United States; *provided, further*, that whenever, in the opinion of the Secretary of War, the public interests require it, he may make rules and regulations to govern the opening of drawbridges for the passage of vessels and other water crafts, and such rules and regulations, when so made and published, shall have the force of law, and any violation thereof shall be punished as hereinbefore provided.

SECT. 6. That it shall not be lawful to place, discharge, or deposit, by any process or in any manner, ballast, refuse, dirt, ashes, cinders, mud, sand, dredgings, sludge, acid, or any other matter of any kind other than that flowing from streets, sewers, and passing therefrom in a liquid state, in the waters of any harbor or river of the United States, for the improvement of which money has been appropriated by Congress, elsewhere than within the limits defined and permitted by the Secretary of War; neither shall it be lawful for any person or persons to move, destroy, or injure in any manner whatever any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States, in whole or in part, for the preservation and improvement of any of its navigable waters, or to prevent floods, or as boundary marks, tide gauges, surveying stations, buoys, or other established marks; any and every such act is made a misdemeanor, and every person knowingly engaged in or who shall knowingly aid, abet, authorize, or instigate a violation of this section shall, upon conviction, be punishable by fine or imprisonment, or both, such fine to be not less than two hundred and fifty dollars nor more than twenty-five hundred dollars, and the imprisonment to be not less than thirty days nor more than one year, either or both united, as the judge before whom conviction is obtained shall decide, one-half of said fine to be paid to the person or persons giving information which shall lead to conviction of this misdemeanor.

SECT. 7. That any and every master, pilot, and engineer, or person or persons acting in such capacity, respectively, on board of any boat or vessel who may wilfully injure or destroy any work of the United States contemplated in section six of this Act, or who shall knowingly engage in towing any scow, boat, or vessel loaded with any such prohibited matter to any point or place of deposit or discharge in any harbor contemplated in section six of this Act, elsewhere than within the limits defined and permitted by the Secretary of War, shall be deemed guilty of a violation of this Act, and shall, upon conviction, be punishable as hereinbefore provided for offences in violation of section six of this Act, and shall also have his license revoked or suspended for a term to be fixed by the judge before whom tried and convicted.

SECT. 8. Any boat, vessel, scow or other craft used or employed in violating any of the provisions of sections six and seven of this Act shall be liable to the pecuniary penalties imposed thereby, and in addition thereto to the amount of the damages done by said boat, vessel, scow, or other craft, which latter sum shall be placed to the credit of the appropriation for the improvement of the harbor in which the damage occurred, and said boat,

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vessel, scow, or other craft may be proceeded against summarily by way of libel in any district court of the United States having jurisdiction thereof.

SECT. 9. That whenever the Secretary of War grants to any person or persons permission to extend piers, wharves, bulkheads, or other works, or to make deposits in any tidal harbor or river of the United States beyond any harbor lines established under authority of the United States, he shall cause to be ascertained the amount of tide water displaced by any such structure or by any such deposits, and he shall, if he deem it necessary, require the parties to whom the permission is given to make compensation for such displacement either by excavating in some part of the harbor, including tide-water channels between high and low water mark, to such an extent as to create a basin for as much tide water as may be displaced by such structure or by such deposits, or in any other mode that may be satisfactory to him : *provided*, that all such dredging or other improvement shall be carried on under the direction of the Secretary of War, and shall in no wise injure any existing channels.

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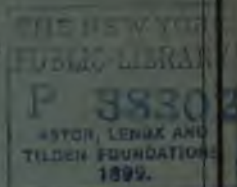
OF THE

BOARD OF HARBOR AND LAND
COMMISSIONERS

FOR THE YEAR 1895.

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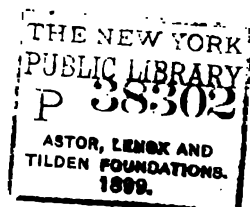
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ANNUAL REPORT

OF THE

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BOARD OF HARBOR AND LAND
COMMISSIONERS

FOR THE YEAR 1895.



BOSTON :

WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1896.

Commonwealth of Massachusetts.

REPORT.

To the Honorable the Senate and House of Representatives of the Commonwealth of Massachusetts.

The Board of Harbor and Land Commissioners, pursuant to the provisions of law, respectfully submits its annual report for the year 1895, covering a period of twelve months, from Nov. 30, 1894.

HEARINGS.

The Board has held one hundred and seventy-seven formal sessions during the year, at which two hundred and sixteen hearings were given. One hundred and seventy-five petitions were received for licenses to build and maintain structures, and for privileges in tide waters, great ponds and the Connecticut River; of these, one hundred and sixty-one were granted and fourteen denied.

On May 17, 1895, a hearing was given in Chatham on the petition of Rufus Smith and others for license to draw water from Lovers' Lake.

On July 29, 1895, the Board, sitting with the Railroad Commissioners as a joint board, under the provisions of chapter 464 of the Acts of 1895, gave a hearing on the petition of the Massachusetts Ship Canal Company for the approval and certification by said joint board of the issue of stock and bonds by said company.

On Sept. 20, 1895, a hearing was given in the city of Springfield on the petition of said city for license to build sewer outlets on the Connecticut River.

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On Oct. 17, 1895, a hearing was given in North Carver on the petition of the Muddy Pond Company for license to draw water from Cooper's Pond in Carver.

All other hearings were given by the Board at its office in Boston.

SOUTH BOSTON FLATS.

The work of filling and improving the tide-water lands known as the Commonwealth's flats at South Boston has been confined to completing the work already laid out, and such incidental doings as have been necessary in connection therewith.

During the year the filling of the 170 acres which have been inclosed by sea walls and bulkheads, together with the filling to grade 16 of the streets already planned thereon, has been completed with the exception of about 900 feet of Congress Street which still requires to be widened 25 feet.

The contracts * with Messrs. Perkins & White, dated June 13, 1893, and Aug. 3, 1894, for grading with gravel D and E Streets, between Cypher and Congress Streets, and the cross streets between C and E Streets, have been completed.

During the year 33,162 cubic yards of gravel were delivered and placed, making a total of 73,662 cubic yards deposited under these contracts. The areas of streets graded thereunder are as follows : —

	Sq. Ft.
D Street, 60 feet wide,	144,000
E Street, 80 feet wide,	192,000
Cross streets, 50 feet wide,	311,200
Total,	647,200

The contract price was \$46,407.06; this makes the cost of grading the streets 7.17 cents per square foot.

Pursuant to the contract † made Sept. 12, 1894, with the New England Dredging Company, for filling to grade 13 the seventy-acre lot north of Congress Street, 135,790 cubic yards of material have been deposited and graded. This material was dredged from the bar at the mouth of Chelsea

* See Appendix to reports for 1893 and 1894. † See Appendix to report for 1894.

Creek and from the Reserved Channel on the South Boston flats, thereby conforming to the original plan of this work, which was, primarily, to improve the harbor, and, secondarily, to increase the wharfing and commercial facilities of Boston. The cost of this work was \$62,463.40, the contract price being 46 cents per cubic yard measured in the fill. This material was deposited by the hydraulic method, and, as it was mostly clay, it remained soft for a long time. Nearly three months passed after the material was deposited before it could be measured; in the mean time it had settled considerably, and will continue to settle appreciably for some time. By this method the filling is laid down very evenly. When, however, the material consists of clay, it is separated so finely and disintegrated to such an extent by the water used for transporting it that a long time elapses after the filling is deposited before the territory is in condition to be used.

The dredging at the mouth of Chelsea Creek, under this contract, has increased the available depth in the creek six feet. There are now eighteen feet over the bar at low water, where there were formerly twelve feet, and this increased depth can now be carried above the Grand Junction railroad bridge.

The dredging in the Reserved Channel has increased the depth in the cut-off channel to twelve feet at mean low water, and the width of the main portion of the channel has been increased to two hundred feet at the same depth.

During the year the filling, composed of material brought in carts seeking a dumping place, has been spread over a large area, and the greater part of the time and attention of two men has been occupied in supervising the work and doing the necessary grading. This material has been largely from cellar and street excavations; the better portions thereof, being mainly gravel, have been used in widening Congress Street. About one-half the length of this street from C Street to the Reserved Channel has been already filled out to the width of one hundred feet.

Nothing was done on this street by the city of Boston until last October, when the roadway of the section from the Boston Wharf Company's land to C Street was rough-graded

and covered with a coating of gravel and rolled, thus making a very passable road. The surveyors of the street commissioners are now engaged in surveying this street, preparatory to making a plan for laying it out as a public highway, and it is expected that the plans will be completed before next spring. When this shall be done a great improvement will have been accomplished and an additional value given to the adjoining territory. One-half the cost of paving will be borne by the Commonwealth.

The prolonged delay and uncertainty about completing Congress Street for public travel, combined with the utility of preserving it at grade with adjoining territory, for the purposes of heavy teaming, decided the Board that it ought to be laid out one hundred feet wide and paved at grade. Deviations from grade add to the cost of transportation, and, as the territory in question is bound to develop heavy traffic, and is already a considerable terminal, facilities tending to economize the conveyance of merchandise are entitled to thoughtful consideration. A paved street one hundred feet wide in this location will readily admit of an iron superstructure or elevated street as wide as may be necessary, whenever the travel from beyond L Street bridge over Congress Street shall make it enough of a thoroughfare to require it.

This street can never be considered a desirable one for rapid service, on account of the nature of the traffic which inevitably will occupy it in the future, as well as on account of the number of railroad crossings at grade, which, in using the filled land to the north of it to the highest degree of usefulness, must necessarily exist. It is probably true that another and shorter line of street-car service to South Boston will be demanded in the near future. It is therefore suggested that, if Mt. Washington Avenue were extended in a straight line from the bridge across to B Street, thence over this avenue as laid out on the plan of the Commonwealth's flats to E Street, thence across the flats south of the Reserved Channel to the junction of First and H or I Streets, a thoroughfare would be established through the centre of the property of the Commonwealth, whereby this land could be more readily brought into the market, and at the same time the shortest line of communi-

cation between the South Boston Marine Park and the southern railroad stations would be instituted. If some such plan were carried out, it would have the merit of enhancing the value of the Commonwealth's property in this section, as well as affording a great public convenience.

The wooden bulkheads which inclose the northerly and easterly sides of the filled land are of a temporary character, built in 1890 and 1891, and unless injured by fire will probably last, without extensive repairs, about five or six years longer.

During the year the sand filling in front of a section of about one hundred and seventy feet near the middle of the bulkhead on the northerly side was washed away to such an extent that the bulkhead began to give way, and it became necessary to strengthen it with stone riprap. Nov. 21, 1895, a contract* was made with Hugh Farrell, the lowest bidder, to do this work for the sum of \$257, and it is now in progress.

The balance in the Commonwealth's flats improvement fund on the first day of December, 1894, was \$91,432.38. To this has been added during the year \$5,293.15 from the income of the fund, \$288 from rents of land, and \$30,000 paid into the fund from the treasury of the Commonwealth under the provisions of chapter 93 of the Acts of 1889 and chapter 401 of the Acts of 1895, making a total of \$127,013.53. Of this sum there has been expended during the year \$99,563.47, leaving an available balance on Nov. 30, 1895, of \$27,450.06. It is estimated that this balance will pay a portion of the Commonwealth's share of the cost of paving Congress Street, as above stated, of building sewer and sidewalks therein, and for the care of the property during the coming year, including supervision of the dumping of material and necessary grading. The authority to expend the money in the Commonwealth's flats improvement fund will also be exhausted by the expenditure of the above balance, and it will be necessary to obtain additional legislative authority before any money which may be received from the sale or lease of land at South Boston can be expended.

* See Appendix A.

Suggestions relating to the further improvement of the Commonwealth's flats at South Boston would be untimely at present, owing to the creation of a board at the last session of the Legislature whose special function it is to consider the whole subject of harbor development in its widest scope, and to report to this General Court.

SURVEYS, ETC.

During the past year about one-half the time of the engineering force has been occupied in the work in connection with the Commonwealth's flats at South Boston, in giving lines and grades for filling and grading and for making monthly and final estimates on which payments for the work are made, and in inspecting the work during construction; in connection with this work the plane table sheets or maps of the vicinity have been corrected and brought up to date.

In December, 1894, soundings were taken in the docks of the National Dock & Warehouse Company at East Boston. The level of low water in Muddy Pond in Hardwick was also established, and reference bench-marks set in the shore of the pond.

In April soundings were taken in the channel which had been dredged through the bar at the mouth of Chelsea Creek.

In April and May soundings were taken over the area dredged in front of the wharves of the Boston & Maine Railroad, the Cunard Company, and of Pier No. 1 of the Boston & Albany Railroad Company at East Boston.

In May soundings were taken along the city frontage from Constitution wharf to the North Paving wharf, and the plane table sheet of this portion of the city frontage, including the North End Park, was corrected and brought up to date. A survey was also made of Beverly Creek in Beverly, from its mouth up to Bridge Street, and the high and low water lines were surveyed and plotted on the plane table sheet, and soundings taken over the upper section of the creek, where certain riparian owners desired to extend their wharves. Soundings were also taken this month over an area near Chelsea bridge at the mouth of Mystic River, for the purpose of completing the survey between Chelsea and Meridian Street bridges.

In June and July soundings were taken over the portion of the Reserved Channel on the South Boston flats below L Street bridge.

In July the annual survey and levels were taken on Salter's beach near the Gurnet in Plymouth. This is the seventh year in which these levels have been taken, and they show that the beach shifts somewhat from year to year, but as yet without any marked change in either direction. During these seven years, 8,918 tons of roofing gravel have been removed from this section of the beach under license from this Board. Nearly one-third of the whole amount, or double the average quantity, has been removed during the past year. A survey was also made in this month of the portion of Crystal Cove in Winthrop, lying northerly of Washington Avenue bridge, including soundings and levels for the purpose of determining the amount of tide water cut off by filling solid this bridge.

In August, September and October, soundings were taken over the area dredged to the depth of twenty-seven feet below mean low water, opposite Dock No. 6 of the Grand Junction wharves in East Boston.

In September, October and November, soundings were taken in Charles River, opposite the Hoosac Tunnel docks, to determine the amount of material to be removed to obtain twenty-seven feet at mean low water in front of Piers Nos. 3 and 4, and after the dredging was finished, to ascertain whether the work had been properly done; at the same time the plane table sheet of this section of the harbor frontage was corrected and brought up to date.

In October soundings were taken at the head of the Reserved Channel on the South Boston flats near E Street.

In October and November surveys and examinations were made of the Province Lands at Provincetown, to determine the size, location and ownership of the various areas which are and have been occupied by various individuals under claim of right.

In November a re-survey of Mystic River above Chelsea bridge was commenced, and will be prosecuted whenever the field party can be spared from more pressing work.

The last survey of this river was made in 1861, and, as many changes have been made since then, the old plans are of very little assistance in showing the present condition of the river.

Twenty-one structures recently built along the harbor frontage of the city and vicinity have been examined and measured from time to time, to determine the amount of tide water displaced by their construction.

In addition to the surveys and soundings made in connection with contracts for dredging, the work has been carefully inspected, lines and ranges established, and tide gauges set for the guidance of the contractors; and, in cases where the dredged material has been taken to sea, an inspector has accompanied each fleet of scows, to ensure the material being dumped at the places prescribed by the contract.

The results of all surveys made have been plotted on suitable plans in the office, and put in such permanent shape as will make them valuable for future use. During the year the Board has had tracing copies made, at the office of the United States Coast and Geodetic Survey in Washington, of seven sheets of the plans, not yet published, showing soundings taken by the Coast Survey in their re-survey of Boston harbor in 1892-93. From these plans a large map of Boston harbor has been made, on which have been plotted the changes in the channels by dredging since the above survey. The data for showing the work done by the United States government in the lower harbor was obtained from the office of the United States engineers in Boston, through the courtesy of Lieut.-Col. S. M. Mansfield. The changes in the upper harbor are from surveys made by the employees of the Board.

The work of repairing worn and torn plans and of indexing and arranging them has proceeded, and a large number have been mounted upon cloth. Again the consideration of the Legislature is invited to the fact that the invaluable collection of maps and plans in this office is without adequate protection from fire, and that any considerable injury from that cause would in all probability be irreparable.

IMPROVEMENT OF BOSTON HARBOR.

This subject is one indissolubly connected with the success of the chief commercial city in the Commonwealth, the first in New England, and second only, in importance, in the country. The total amount of tonnage entered and cleared for the year ending June 30, 1870, was 1,264,160 tons; for the year ending June 30, 1895, 3,190,328 tons. The values of imports and exports were: Importations,—for the year ending June 30, 1870, \$47,524,845; for the year ending June 30, 1895, \$66,821,681. Exportations,—for the year ending June 30, 1870, \$12,216,815; for the year ending June 30, 1895, \$85,035,218. Concurrently with the increase in the volume of trade at the port of Boston, which is shown by the foregoing figures, there has been an increase in the size and draught of the transatlantic steamships loading and discharging here. The natural result is a demand for deeper channels and wider water-ways. The main ship channel varies in width from 1,100 feet to about 625 feet at the "Narrows." Its improvement is now in progress, and Lieut.-Col. S. M. Mansfield reports that it "is now 27 feet deep at mean low water, 1,000 feet wide from the entrance of the harbor to 'Bug' Light, 800 feet wide to the passage between George's and Gallop's islands, and thence through the 'Narrows,' 550 feet wide. A free use of this increased depth cannot be made until the ledges uncovered by the dredging are removed." It is far from straight, and the different courses which must be steered to avoid rocks and shoals, and the cross-currents which are encountered in its navigation, are elements of danger to large vessels. In addition to this, the increasing use of the channel by sailing craft and "tows," in the avoidance of which steamships are often put to the choice of going ashore or incurring a collision, creates fresh perils to navigation. An obstruction caused by the accidental stranding of a large steamer across the channel might become a serious interference with commerce of many months' duration. When this is weighed in connection with the fact that Boston is the second largest provision-packing city in this country and ships more grain

to Liverpool than any other port in America, and more than one-third of all the cattle which are carried there, in addition to the enormous tonnage of provisions, cotton and other merchandise, it becomes difficult to realize the amount of damage which would ensue from such a disaster.

It seems to the Board that the time has come for considering the much needed improvements in Boston harbor in a broad and comprehensive way. The federal government is at work on its project of deepening and widening the main ship channel so as to obtain 27 feet at mean low water and 1,000 feet in width up opposite to Constitution wharf. But since this work has been entered upon the draught of the largest vessels which now sail to and from this port has increased several feet, and their carrying capacity has doubled.

Under these circumstances, the question as to what is to be done to maintain Boston as a first-class port becomes imperative. A careful study of the map gives an adequate solution. Broad Sound Channel, on leaving President Roads, is obstructed between Deer and Green islands and for some distance outside by shoals, and by sundry rocks and ledges beyond. It is thought that an expenditure of from one-half to three-quarters of a million dollars will remove all obstructions and give a fair way from the bay into President Roads, 30 feet deep at mean low water and several thousand feet wide. This would ensure an adequate approach to the harbor in a straight course for all time to come. But beyond this, in the interest of economy of time and despatch, without which the sharp competition of the present day cannot be met, vessels of the largest size should be enabled to steam to their berths without delay in waiting for the turn of the tide. To this end is required a channel of varying but sufficient width from President Roads to the railroad terminals, with a depth of 30 feet at mean low water. These two requirements are essential to enable Boston to provide adequate accommodation for the growing demands of her commerce.

The great trade associated bodies in Boston have recently given this subject much thought and attention, and, it is believed, have already enlisted the co-operation of senators and representatives in Congress, not only from this Com-

monwealth, but other New England States, in an effort to obtain an appropriation sufficient to carry out the improvement on the lines indicated. Meanwhile, in order to secure comparatively safe progress for such first-class steamships as shall come here, that we may lose nothing through lack of sufficient depth of water, the work of this Board, in deepening the water-ways between the main channel and to within fifty feet of the docks, wherever the draught of vessels requires it, should proceed under such appropriation, in addition to the income of the harbor compensation fund for Boston harbor, as it may please the General Court to appropriate for that purpose.

In order that not only our own citizens, but those having an interest in the port, may have a right knowledge of the existing channels and depths of water here, as well as of the possibilities of the proposed improvements, the map of Boston harbor, hereinbefore mentioned and appended to this report, has been prepared in this office from the latest official surveys of the United States government and from those made under the direction of this Board, and represents with accuracy the present depths of water and the physical conditions of the harbor.

The improvements made in Boston harbor during the year from the income of the harbor compensation fund have been wholly in deepening the approaches to the wharves of the large ocean steamships, and were made necessary by the increased size and draught of the new class of vessels which are now building.

In September, 1894, the Cunard Steamship Company informed this Board that the new steamships which it was about to send to Boston would draw 27 feet, and that it was having its docks dredged for their accommodation, and requested the Board to dredge the area between the ship channel and its wharf for the same purposes.

On Feb. 19, 1895, a contract * was made with the Eastern Dredging Company, the lowest bidder, to dredge the area in front of the Cunard wharf and in front of the docks between it and the wharves of the Boston & Maine Railroad and the Boston & Albany Railroad Company on either side,

* See Appendix B.

from a line 50 feet outside of the harbor line to the main channel of the harbor, to the depth of 27 feet at mean low water. This involved the dredging of 27,500 cubic yards from an area of 215,100 square feet, or about 5 acres. The contract price was \$11,950 and the work was completed May 11, 1895.

In June the Boston & Albany Railroad Company requested the Board to have the approach to its Pier No. 6 dredged to 27 feet at mean low water, as its tenants, the Leyland Steamship Company, were about employing very much larger and deeper draught vessels. At the same time the Fitchburg Railroad Company made the same request concerning the approach to its Piers Nos. 3 and 4 at the Hoosac Tunnel docks. As the amount of money at the disposal of the Board was limited, only a small amount of dredging could be done; it was, however, decided to do all that the money would allow, and a contract * was made July 23, 1895, with the Eastern Dredging Company, the lowest bidder, to dredge 19,500 cubic yards in front of Dock No. 6, Grand Junction wharves, East Boston, from an area of about 144,000 square feet, making a channel about 200 feet wide and 27 feet deep at mean low water, from this dock to the main channel of the harbor. The contract price was \$8,570. The work was completed Oct. 2, 1895.

Sept. 6, 1895, a contract † was made with the Eastern Dredging Company, the lowest bidder, to dredge 4,500 cubic yards in front of Piers 3, 4 and 5 of the Hoosac Tunnel docks at Charlestown, from an area of about 71,200 square feet, making a depth of 27 feet at mean low water, for the sum of \$2,270. By agreement with the Fitchburg Railroad Company, \$1,270 of the contract price was paid by it, as about one-half the work was within 50 feet of the harbor line. This work has been completed.

In January the Constitution Wharf Company requested the Board to dredge the shoal in front of its wharf; but it was found upon examination that this shoal was almost wholly within the limit of 50 feet outside the harbor line. A few years ago 23 feet at mean low water in the channel and approaches to the wharves, with 25 feet in the docks,

* See Appendix C.

† See Appendix D.

was ample, but now some of the largest vessels can barely at high water come through the channels which are dredged to 23 feet; and to enable them to lie safely in the docks, it is necessary to have a depth of from 30 to 33 feet therein at mean low water.

The dredging of docks and the area in front of them for a distance of 50 feet beyond the harbor line, this line being usually at the end of the piers in the case of the main wharves in the harbor, is done and paid for by the owners of the docks.

The dredging and improvement of the main channels is undertaken by the general government, while the connecting space between the main channel and the line 50 feet outside the harbor line has habitually been done by this Board, acting for the Commonwealth, and paid for from the income of the harbor compensation fund for Boston harbor. In 1894 this income was about \$8,600, and is increasing each year slowly; but the work to be done is greater than the income of the fund can maintain.

This Board is constituted with a view to the preservation, maintenance and improvement of the harbors of the Commonwealth, to the end that the injudicious efforts of other interests may not impair their usefulness. The harbor of Boston has from time to time received the greatest amount of consideration, because of the greater encroachments incidental to its being the harbor of a great port surrounded by a large and growing population, with all the resulting increase of business and concentration of territorial occupation. Many commissions and boards of scientists and laymen of the most distinguished ability have considered and laid down the principles which should govern permitted encroachments on the tidal basins and channels, they being the physical conditions of the harbor which give it permanent value. The preservation of these conditions within the limits uniformly approved by these great authorities is a matter of paramount care to this Board, and it desires to emphasize its conclusions in its last report with reference to the Charles River dam. This Board cannot but be apprehensive of the results of any attempt to materially diminish or alter the flow of the tributaries of the harbor without first

submitting to a board of hydrographic engineers all matters intended to effect any considerable change in the reservoirs and basins which now contribute to the tidal flow through the upper harbor of Boston.

GREEN HARBOR.

In November a petition was presented to this Board, signed by almost all the property owners resident in the vicinity of Green Harbor and Brant Rock villages, representing in value of real estate about \$326,000, asking this Board to take action relative to the condition of Green Harbor, to the end that its value and usefulness as a harbor might be restored. The history of the doings, under chapter 303 of the Acts of 1871, authorizing a dam and dikes across Green Harbor River, demonstrates the injurious results predicted in the fifth annual report of the Harbor Commissioners.

It seems that an experiment was tried in diking Green Harbor River from which an agricultural benefit was expected to be derived, and it was at the time claimed that such benefit would be obtained without damage to the harbor. Remedial measures were provided in the original act for the case of shoaling. Shoals formed, and, in pursuance of the statute provisions, the Board of Harbor Commissioners ordered the proprietors of the marsh to remove the shoals at their expense. This order was not complied with, and chapter 219 of the Acts of 1877 was passed to enforce the provisions aforesaid, and gave jurisdiction to the supreme judicial court in aid thereof. Proceedings were had in the supreme court and ultimately dismissed.

The petition aforesaid alleges the existence of a nuisance injurious to health; that all other remedial means to them (the petitioners) known are exhausted, and asks the intervention of this Board, invoking its aid "in causing the tides to ebb and flow freely where now impeded." Owing to the urgency of the petition as presented, and to the fact that the late date at which it was filed precluded a hearing and determination of the facts in season to report this year, and to the further consideration that, if the allegations were found to be true, it would not be within the powers of this Board to afford the relief prayed for, the subject is respectfully

referred to the Legislature, for such further direction or authority to this Board as the matter may seem to require.

GREAT PONDS.

The jurisdiction given this Board over great ponds by chapter 318 of the Acts of 1888 has been frequently invoked during the past year. The encouragement given to cranberry culture by legislation leads to a desire on the part of the cultivators to appropriate more or less of the waters in the great ponds for the purpose of flowing their cranberry bogs, quite regardless of the interests of the public in their preservation as objects of picturesque beauty or of usefulness on sanitary or other grounds. In some instances, where no serious objections seem to exist, petitions for license to take water have been granted under strict limitations; in others, the licenses have been refused.

On April 30, 1895, a complaint was filed in this office, stating that infringements had been made and were threatened on the area of Crystal Lake, a great pond containing about thirty-three acres, situated between Newton Centre and Newton Highlands, by Mr. George H. Ellis, an owner of premises adjacent thereto.

The complaint requested the immediate attention of this Board to the matter, and was signed by a committee of citizens of Newton. An order of notice was issued and a hearing was had, at which it appeared that Mr. Ellis was acting under a claim of right which involved the question of the title to the pond; whereupon, in pursuance of the requirements of the provisions of chapter 318 of the Acts of 1888, the whole subject was referred to the office of the Attorney-General for the determination of the rights of the Commonwealth in the pond aforesaid.

On June 4, 1895, a complaint was made to the Board of encroachments upon the area of Little Pond in Braintree by filling below high-water mark without license, in violation of the Act of 1888. All parties in interest were given a hearing on June 18, and, it appearing from examinations made by the Board that the complaint was well grounded, the matter was subsequently referred to the Attorney-

General, in order that suit might be brought in behalf of the Commonwealth and such action taken as might be necessary to protect the rights of the public.

PROVINCE LANDS.

The care of the Province Lands, committed to this Board by chapter 470, Acts of 1893, has been a constant and interesting study. Last year the Board associated with its superintendent in an advisory capacity Mr. Leonard W. Ross, a landscape engineer, who gives his services gratuitously, and once a month these two meet the Board for consultation in planning and directing the progress of work at Provincetown. The history of the reclamation of sand barrens by the sea in other parts of the world shows that the loose sands may be not only fixed but in time made productive; notably the Landes or heaths of Gascony, containing about 1,700,000 acres; the Campine in Belgium and Holland, containing about 350,000 acres; the lands in Denmark, in Western Jutland, where in 1854 there were 3,614,720 acres, mainly of turf and sand dunes, and where the experiments of the past twenty-seven years have so covered this sand area with vegetation that there remains to-day only about 1,581,653 acres unreclaimed. There the system of nurseries has proved a great success, their great value being that the plants are started in the same kind of soil into which they are to be transplanted, and exposures incidental to long transportation are avoided.

As conditions of climate and exposures vary, so also must the selection and treatment of the grasses, shrubs and trees, by means of which the sand dunes of Cape Cod are to be reclaimed; and experience alone will ultimately determine what will thrive best in that particular locality. The severity of last winter was very destructive to the plantings of the previous season, and the Scotch broom, poplars and willows planted in exposed places suffered greatly. In the light of that experience and further study, during this past year we have been planting beach grass along the sands under the lee of existing vegetation and on the northern range of sand hills, until an area of about thirteen acres has been



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covered. This has taken root readily, and already gives promise of its ability to resist the sand storms. There were also set out at the foot of the slope about 2,300 willows of various kinds, a thousand or more silver poplars and some 2,500 pines (*Pinus rigida*). In addition to the foregoing, about 20,000 willow slips have been set down among the beach grass.

In connection with this work it has been found desirable to establish a nursery for bringing forward young plants, slips and seedlings to a growth that would better enable them to withstand the exposure incident to their permanent planting, and also to have at hand a supply of stock of the right kind for transplanting at the lowest cost. We have at the present time growing in the nursery from 200,000 to 250,000 young trees of the following kinds: pine, locust, alder, birch, hornbeam, ailanthus and maple, of which the larger part are pines, as being especially adapted for the uses intended. In addition, we have some 30,000 to 40,000 shrubs of the privet, thorn, and Scotch broom. All these will need another year's growth in the nursery, and then we shall expect to have an annual supply commensurate with our wants for transplanting. In all this work our superintendent expresses himself as greatly indebted to Mr. Ross for "much valuable assistance and advice."

The road out through Nigger Head to the life-saving station is slowly progressing. It is worked on at times not suitable for planting. Enough wood has been removed from within the lines thereof during the year, and sold, to amount to eighteen dollars.

On the adjoining pages are shown four photographs, taken last summer by Mr. F. Lamson-Scribner, United States agrostologist, to whose courtesy we are indebted for them. They fairly show the difference in appearance made by planting the beach grasses in the dreary waste of sand.

Hereinafter will be found the report of the superintendent in full, and interesting letters from learned scientists employed by the United States in the Department of Agriculture at Washington, who are interested in this experiment.

A careful investigation discloses the fact that no less than one hundred persons or estates have been in the habit of

exercising acts of ownership over as many or more isolated parcels in different parts of the Province Lands. These have now been located, and the users or occupiers (of whom we have a perfect list) identified. Early in the spring a notice* was given to all then known to use or occupy these parcels that the Commonwealth was asserting its ownership over the district, and that in disregarding the notice they were liable to be treated as trespassers. It was at first thought that these occupiers might continue under a license or lease from the Commonwealth; but it is now certain that, the less cultivated and wilder the growth on the oases of the sand barrens, the more rapid will be the growth of the wind breaks and sand barriers.

As this interesting work progresses, and the Board is able to demonstrate its ability to prevent the drifting of the sands inland and any further burying of existing vegetation, larger appropriations will be needed for several years to come; but the time is not far distant when we shall be able to confidently foresee an entire reclamation of the Commonwealth's lands at the end of Cape Cod.

WRECKS.

On Dec. 11, 1894, proposals were received for the removal of the wreck in Hull Bay, which was described in our last report, and a contract† was made with Alfred Sorensen, who completed the work and placed the material taken from the wreck upon Hangman's Island before June 1, 1895, at an expense to the Commonwealth of \$740. The wood will be used for fuel by the inhabitants of the island.

On March 2, 1895, the iron steamship "Venetian," owned by the Leyland line, but leased and operated by the Furness line, and plying as a freight steamer between Boston and Liverpool, while proceeding to sea in a snow squall was obstructed in her passage through the Lower Middle in Boston harbor, being forced out of her course to avoid a sailing vessel, and grounded on State Ledge, on the northerly side of the Lower Middle Channel, in about seventeen feet of water at low tide. The vessel struck just after high water,

* See Appendix G.

† See Appendix E.

and when the tide fell she was badly strained, and in the course of a day or two broke in two in the middle.

The owners proceeded at once to remove such portions of the cargo as were uninjured and valuable, and notified the underwriters that they abandoned the vessel to them. The vessel and the balance of the cargo were advertised to be sold at auction on May 1, but only the balance of the cargo was so sold and the larger part removed.

Previous to this sale it was rumored that parties proposed to purchase the wreck and remove the portion above water which could be readily broken up, and such portions below as could be easily removed, leaving the bottom and portions of the sides of the hull, which it would not pay to take out, an obstruction to navigation. Upon hearing this, the Board decided that it was for the best interests of the harbor to notify the owners to remove the wreck on or before August 1, in accordance with the provisions of chapter 260 of the Acts of 1883, as in their opinion it was, or was liable to become, a serious obstruction to the navigation of the harbor. This notice was dated April 30, 1895, and served upon the agents of the owners, lessees and underwriters, and also upon the auctioneers who had advertised the sale of the wreck. No bids were received for the vessel. Conferences were had with the agents of the owners and underwriters, which resulted in their executing and delivering to the Board disclaimers of any ownership in the wreck; and on July 12 the Board issued proposals for its removal. These were received and opened July 25, and a contract* was made July 30 with George W. Townsend of Boston, the lowest bidder, to remove the wreck completely, for ninety-nine per cent. of the receipts from the sale of the material; the work to be commenced at once, and to be completed on or before Nov. 30, 1896. The work was commenced within a week after the execution of the contract, and has progressed rapidly since that time. The forward portion has been removed down to the level of low water; the foremast has been removed and a large amount of work done on her after portion; considerable work has also been done on the forward portion below the level of low water.

* See Appendix F.

After issuing notices to the owners to remove her, the Board, by letter dated April 30, 1895, notified the federal government of the wreck, and requested such action as would cause its removal by the United States. This letter was at once acknowledged, but no action was taken, the government considering that the wreck was not an obstruction to navigation, inasmuch as it was only upon the edge of and not within the deep water channel.

On June 24, 1895, the schooner "Robert Mowe" of New York, loaded with two hundred and ninety tons of stove coal, grounded on "Stone Horse Shoal" and sprung a leak. The crew got her off and sailed her into Hyannis harbor, where she was allowed to fill and sink, thereby causing an obstruction to navigation. Lieut. Wm. W. Harts, United States engineer officer at Newport, notified the Board of this wreck, and, after investigation, notice was issued to the owner to remove the same before Aug. 14, 1895. On August 21 Lieutenant Harts reported that nothing had been done towards removing the wreck, and upon the request of this Board he caused the work to be done at the expense of the United States.

On June 27, 1895, it was reported to the Board that there were two wrecks in Plymouth harbor which were obstructions to navigation. An examination was made, and it was found that they were the wrecks of two small vessels which were lost a number of years ago, names and owners unknown. The one lying near the entrance to the channel leading to Kingston was deemed to be a sufficient obstruction to warrant its removal, and Capt. D. H. Craig of Plymouth was employed to do the work for \$150, the same being completed before Sept. 30, 1895.

The other wreck was so high up in the middle of a large flat that the obstruction it caused to navigation was too inconsiderable to warrant the expense of removal.

In September it was reported that there was a wreck in Kingston harbor, a short distance north of the wharf on the west side of Captain's Hill in South Duxbury. Upon investigation it was learned that it was the hull of an old vessel which had drifted from the wharf at South Duxbury and was lying in a small channel just north of the wharf, being covered

at nearly all stages of the tide. It was not thought to be sufficiently dangerous to navigation to warrant the expense of removal, but, as it is in the way of boats sailing in the vicinity, an arrangement was made with O. C. Hunt of South Duxbury to mark its exact location by bushes or other means, at an expense to the Commonwealth of \$15 per year.

On Oct. 26, 1895, the harbor master of Boston reported that on the night of October 26, the schooner "Lillie" of Portsmouth, loaded with brick, was sunk in Broad Sound near Deer Island Light by collision with the fishing schooner "Wm. H. Cross" of Gloucester. The Board notified Lieut.-Col. S. M. Mansfield, the United States engineer officer in charge of this district, who replied that the wreck, or at least the masts, were an obstruction, and should be removed at once, but that the "laws of the United States provide only for the removal of wrecks of vessels after they have been permitted to remain to the injury of commerce and navigation for a longer period than one month." Proposals have recently been invited by the government for the removal of this wreck.

On Oct. 26, 1895, the harbor master also reported that the fishing schooner "John F. Nickerson" of Provincetown had been run down and sunk by an unknown tug on the southerly side of the channel in Boston harbor, opposite the wreck of the steamship "Venetian," and that she was an obstruction to navigation. The Board reported this case also to Lieut.-Col. Mansfield, who admitted that she was undoubtedly a serious obstruction to navigation, but was satisfied that she would be removed at once by her owners. This was subsequently done.

The Board, after examining the location of the wreck of the barge "John Mason" near Commercial wharf in Nantucket, which was described in our last report, concluded that it was not such an obstruction to navigation as would warrant any expenditure by the Commonwealth for its removal.

The subject of so amending chapter 260, Acts of 1883, as to prevent frequent recurrence of the wrecking of vessels in shoal waters, stripping them and then abandoning them to become obstructions to navigation, to be ultimately removed

at the expense of the Commonwealth or of the United States, is recommended for consideration.

CONNECTICUT RIVER.

The general care and supervision of the river and its banks were committed to this Board by chapter 344 of the Acts of 1885.

By chapter 101, Resolves of 1894, \$2,000 was appropriated to build works under the direction of this Board, to protect the bank of the river in Agawam, and 718 lineal feet were protected, as described in our last report.

In order to complete the work, in the spring of 1895 willows were set out on this section. It is now, even after the very severe test it had in the spring, when the river was higher than it had been for twenty years, in a very satisfactory condition.

By chapter 67 of the Resolves of 1895, \$3,000 was appropriated for continuing this work, and it has been done in the same manner as last year, under the immediate supervision of Mr. E. C. Davis, civil engineer, of Northampton, who has had charge of the work here as well as heretofore at West Springfield and Hadley. After an examination made by the engineer of this Board, it was decided to extend the work up stream about 500 feet, beginning where last year's work ended, and after this was done, to begin at the down-stream end of last year's work, and extend it down the river as far as the appropriation would allow.

This plan was carried out, and this year's work has every appearance of having been done better even than last year's. This is due largely to the experience gained by the men, and to the better quality of stone furnished.

A small balance of the appropriation remains unexpended, which it is proposed to use next spring in planting willows as heretofore, to complete the work. To protect that portion of the bank which is still wearing away will cost about \$3,000 more.

Details as to the execution of the work are stated in the report of Messrs. E. C. and E. E. Davis, civil engineers, which is appended to the report of the Board.

One of the duties imposed upon the Board by chapter 344 of the Acts of 1885 is to cause a survey to be made of that portion of the river lying within the Commonwealth, and to prepare maps of the same. Up to the present time, owing to lack of funds, only so much of the river has been surveyed as has been required in connection with the work of protecting its banks at Hadley, Agawam and West Springfield, and in connection with the establishment of a river line at Springfield. It seems to the Board that the work of mapping the river could be most advantageously done by means of small yearly appropriations, so that it could be carried along carefully without undue haste, and all matters connected therewith could be investigated as the work progressed. To that end it is recommended that an appropriation of \$1,000 be made for carrying on this work during the coming year.

CHARLES RIVER.

During the year the filling to grade 13 of the territory in Cambridge on the northerly side of Charles River and east of Massachusetts Avenue, which was in progress last year, has been completed, and a portion of the streets next easterly of said avenue has been raised to grade 16 with gravel taken from the river.

In all there has been deposited on the Charles River Embankment Company's land, east of Massachusetts Avenue, 126,000 cubic yards of material taken from the river, and on adjoining lots of other parties, as follows:—

	Cu. Yds.
On land of Mrs. Harriet A. Porter,	70,000
On land of estate of F. L. Ames,	12,000
On land of C. H. Souther,	17,000

making the total amount taken from the river during the year, and placed on the territory east of Massachusetts Avenue, 225,000 cubic yards; all of this, except a portion of the gravel used in building the streets, was taken from the flats in front of the land filled and between the sea wall and the channel of the river. Over this area of about 37 acres there is now a depth of not less than 10 feet at mean low water, and the larger part has a depth of from 18 to 27 feet at mean low water.

In the latter part of the season a small amount of material was dredged and placed on the property of John Souther, west of Massachusetts Avenue. A portion of this material flowed onto the land of the Embankment Company. At the present time, with the exception of a small area at the south-westerly corner, which as yet has not been inclosed, substantially the whole of the territory from the westerly boundary of the Embankment Company's property to the channel leading to Smith's coal wharf has been filled to grade 13, and about one-half the streets planned for this area have been built.

The gravel for building the streets is now being removed from the flats on the northerly side of the channel and near West Boston bridge.

The channel remains substantially in the same condition as reported last year, except that a small amount of dredging has been done at the entrance to the draw of Harvard bridge. Large areas of flats on both sides of the river still remain exposed at low tide.

Considerable work of improvement has been done during the year on the Cambridge shore of the river between Craigie and West Boston bridges. The city of Cambridge has built a sea wall from Binney Street to the channel leading to the wharves along Bridge Street, and is filling the area so inclosed for use as a public park. A large amount of filling has also been done on the area between Binney Street and Broad Canal.

Various improvements along the river banks are projected by the Metropolitan Park Commissioners and the Cambridge Park Commissioners for the coming year.

CONVEYANCE TO THE UNITED STATES.

Pursuant to the authority contained in chapter 184 of the Acts of 1880, a conveyance from the Commonwealth to the United States, executed by this Board, with the approval of the governor and council, and dated Sept. 19, 1895, was made of land under water of New Bedford harbor, as a site for a light and fog-signal station on or near Butler flats.

MASSACHUSETTS SHIP CANAL COMPANY.

Pursuant to the authority granted by chapter 464 of the Acts of 1895, the Joint Board of Railroad and Harbor and Land Commissioners heard the petition of the Massachusetts Ship Canal Company, and united in the following order:—

COMMONWEALTH OF MASSACHUSETTS.

IN BOARD OF RAILROAD COMMISSIONERS AND HARBOR AND LAND COMMISSIONERS, SITTING AS A JOINT BOARD.

JULY 30, 1895.

In the matter of the petition of the Massachusetts Ship Canal Company for the approval by the said Joint Board, under chapter 464 of the Acts of 1895, of an issue of capital stock by said company to the amount of \$7,500,000, and also of an issue of bonds by said company to the amount of \$7,500,000, for the purpose of building and equipping a ship canal, and of defraying the expenses incident thereto, as set forth in said petition,—

It appearing, after public notice and hearing, that said company has been chartered and organized for the purpose of constructing and maintaining a ship canal in the towns of Dennis and Yarmouth under the act aforesaid, with an authorized capital stock of \$7,500,000, and bonded debt of equal amount; that before beginning to construct said canal it is necessary for said company to make certain payments and to incur certain preliminary expenses, for meeting which a present issue of capital stock is necessary; and

It being deemed by the said Joint Board that an issue of capital stock to the amount of \$500,000 is reasonably requisite for the purpose of providing for said preliminary payments and expenses, as hereinafter specified,—it is

Ordered, That the said Joint Board approve an issue by the said Massachusetts Ship Canal Company, subject to the provisions of all general and special laws applicable to such issue, of not to exceed 5,000 shares of its capital stock, amounting at the par value thereof to \$500,000; the said issue, or the proceeds thereof, to be applied to the following purposes, and no other, namely:—

1. Stock to the amount of \$150,000 par value, or the proceeds thereof, shall be applied solely to providing the means for making with the treasurer of the Commonwealth the deposit of the sum of \$150,000 required of said company by section 23 of the act aforesaid.

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2. Stock to the amount of \$350,000 par value, or the proceeds thereof, shall be applied solely to defraying the necessary and actual cost and expense incurred by said company for the services of engineers and their assistants, for salaries and compensation of officers, agents, clerks, and other necessary employees, for legal services, for office expenses and supplies, and for other necessary incidental and contingent expenses preliminary to the work of constructing said canal, including the payments required under sections 16 and 18 of the aforesaid act.

The shares aforesaid are to be issued to subscribers to the capital stock of said company, or their assigns, upon the full payment of the par value of such shares in cash.

JOHN E. SANFORD,
WILLIAM J. DALE, Jr.,
Railroad Commissioners.
WOODWARD EMERY,
JOHN I. BAKER,
CHAS. H. HOWLAND,
Harbor and Land Commissioners.

THE CLAIM OF THE FISK HEIRS.

After notification to the claimants, as stated in last year's report, the Legislature passed a resolve, chapter 49, Acts of 1895, permitting them to try their title to the flats in question; and suit was begun and is now in the office of the Attorney-General, where it will in all probability be adjusted without loss to the Commonwealth.

INSPECTIONS MADE DURING THE YEAR.

1894.

Dec. 18. Muddy Pond, in Hardwick.

1895.

Jan. 11. Site of proposed wharf of Josiah G. Munro, in Mat-tapoisett harbor.

Jan. 22. Location of proposed road in Plymouth.

Feb. 14. Wharves at the North End Park, in Boston.

Feb. 15. Site of proposed structures of W. O. Luscombe and Isaiah Spindell, in Woods Holl Great Harbor and Eel Pond, at Woods Holl.

Feb. 15. Wreck on Lynn beach.

March 15. Filling done by F. M. Welles and others, in Winthrop.

March 20. Beach at Tuck's Point, in Beverly. Removal of sand.

1895.

- March 23. Site of proposed wharf of Melville E. Grey on Beverly Creek, in Beverly.
- April 4. Sea wall on premises of Wm. Ross, in Hull.
- April 4. Bridge over Lake Quinsigamond, in Worcester.
- April 8. Sarah H. Stratton's wharf on Fort Point Channel, in Boston.
- April 10. Site of proposed wharf of Wm. H. Mears in Quincy Bay, at Hough's Neck.
- April 12. Site of proposed wharf of Lemuel C. Ring on Merrimac River, in Bradford.
- April 17. Site of proposed sea wall of Robert B. Wardwell, in Swampscott.
- April 24. Work done on Commonwealth's flats at South Boston.
- April 26. Bulkhead on Marshfield beach.
- May 1. Building on the corner of Commonwealth Avenue and Berkeley Street, in Boston.
- May 10. Site of proposed wharf of Wm. H. Fearing, in Wareham harbor, and Spectacle Pond, in Wareham.
- May 17. Lovers' Lake, in Chatham, and bridge over branch of Pleasant Bay, in Orleans.
- May 24. H. Frances Dunning's wharf on Mystic River, in Somerville.
- May 28. Site of proposed embankment of the New York, New Haven & Hartford Railroad Company, in Hull Bay.
- May 31. Site of proposed structure of the Boston Rubber Company on Chelsea Creek, in Chelsea.
- June 5. Tuck's Point, in Beverly. Proposed structures.
- June 6. Site of proposed wharf of the Sagamore Manufacturing Company on Taunton River, in Fall River.
- June 8. Merrimac River, at Carr's Island. Proposed dumping of dredged material.
- June 10. Encroachments upon Little Pond, in Braintree.
- June 14. Site of proposed wharf of A. H. Fuller and I. C. Hammond on Onset Bay, in Wareham.
- June 18. Site of proposed wharf and structure of H. S. Crowell and G. B. Wilbur, in Woods Holl Great Harbor.
- June 19. Site of proposed wharf of J. T. Welch and L. R. Taber on Weymouth Fore River, in Weymouth.
- June 21. Site of proposed wharf of Ella S. Kellen, in Marion harbor.
- July 3. Wreck in Hyannis harbor.
- July 5. Site of proposed wharf of Manchester Yacht Club, in Manchester harbor.

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1893.

- July 8. Structures in Lake Whalom, Lunenburg.
- July 12. S. N. Breed and Company's wharf in Lynn harbor.
- July 12. Charles River. Proposed removal of gravel.
- July 16. Sewer outlets on Nantasket beach, in Hull.
- July 19. Wharves of W. H. Goodwin and T. S. Kirkwood, in Salem harbor.
- July 22. Stony Beach, in Hull. Removal of gravel.
- July 25. Bank of the Connecticut River, in Agawam.
- July 26. Weymouth Fore River. Proposed removal of gravel.
- Aug. 5. Stony Beach, in Hull. Removal of gravel.
- Aug. 8. Powow River. Proposed dumping of dredged material.
- Aug. 12. Encroachment upon the Connecticut River, in West Springfield.
- Aug. 15. Wrecks in Plymouth harbor.
- Aug. 17. Wm. T. Swain's dock, in Nantucket.
- Aug. 20. Weymouth Fore River. Dumping of material.
- Aug. 22. Gloucester harbor. Dumping of material.
- Aug. 24. Bulkhead and filling at Harbor View, in East Boston.
- Sept. 5. Bridge over Little River, in Dartmouth.
- Sept. 11. Cooper's Pond, in Carver.
- Sept. 11. Wrecks in Duxbury harbor.
- Sept. 12. Beach in North Scituate. Proposed removal of gravel.
- Sept. 18. Inspection of work of removal of wrecked steamship "Venetian."
- Sept. 19. Protective work on the Connecticut River, in Agawam.
- Sept. 20. Locations of proposed sewer outlets on Connecticut River, in Springfield.
- Sept. 26. Connecticut River, in Hadley. Removal of gravel.
- Oct. 2. Ocean beach, in Hull. Proposed removal of gravel.
- Oct. 14. Wharf of Slade, Gorton & Co., in Gloucester harbor.
- Oct. 16. Powow River. Proposed dumping of dredged material.
- Oct. 17. Cooper's Pond, in Carver.
- Oct. 18. Site of proposed wharf and ice-break of E. H. Blackwell and L. E. Ames on Monument River, in Bourne.
- Oct. 19. Wharf and dock of Wm. T. Swain and John Killen, in Nantucket.
- Oct. 30. Site of proposed bath-house on Mill River, in Taunton.
- Nov. 1. Inspection of work of removal of wrecked steamship "Venetian."
- Nov. 6. Site of proposed structure of C. S. Clark on South River, in Salem.

1895.

- Nov. 6. Cooper's Pond, in Carver.
- Nov. 9. Protective work on the Connecticut River, in Agawam.
- Nov. 11. Site of proposed wharf of Emeline L. Kenrick on Chelsea Creek, in East Boston.
- Nov. 12. Bridge of the New York, New Haven & Hartford Railroad Company across Taunton River, between Fall River and Somerset.
- Nov. 29. Wharves of R. K. Lufkin, David B. Smith & Co. and G. R. Bradford, in Gloucester harbor.

LICENSES GRANTED DURING THE YEAR.

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| Nos. | |
|------|--|
- 1730. Petition of the city of Medford for license to lay a water main across Mystic River in the cities of Medford and Somerville. Granted Dec. 3, 1894.
 - 1731. Petition of the Bradley Fertilizer Company for license to extend its wharf, on piles, on Weymouth Back River in the town of Weymouth. Granted Dec. 5, 1894.
 - 1732. Petition of C. D. Howland and others for license to build and maintain a pile wharf in Fresh Pond in the town of Plymouth. Granted Dec. 5, 1894.
 - 1733. Petition of the city of Salem for license to build a pile and timber wharf in Salem harbor in said city. Granted Dec. 5, 1894.
 - 1734. Petition of Catherine Doherty for license to build a bulk-head and pile platform, to fill solid and to excavate a channel in Dorchester Bay in the city of Boston. Granted Dec. 5, 1894.
 - 1735. Petition of the Nantasket Beach Steamboat Company for license to rebuild, widen and extend its wharf, on piles, on Weir River in the town of Hull. Granted Dec. 5, 1894.
 - 1736. Petition of the Union Freight Railroad Company for license to dump snow and ice into Charles River and Fort Point Channel in the city of Boston. Granted Dec. 13, 1894.
 - 1737. Petition of Howard Swift and H. Russell Swift for license to construct dams and flumes and draw water from Flax Pond in the town of Falmouth. Granted Dec. 13, 1894.
 - 1738. Petition of Samuel Knight for license to extend his wharf, on piles, in Manchester harbor in the town of Manchester. Granted Dec. 13, 1894.

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- Nos.
1739. Petition of the Nantasket Beach Steamboat Company for license to build a wharf, partly solid and partly on piles, and to construct two dolphins, in Hull Bay in the town of Hull. Granted Jan. 1, 1895.
1740. Petition of the Board of County Commissioners of Bristol County for license to construct fenders at the highway bridge across the East Branch of Westport River in the town of Westport. Granted Jan. 1, 1895.
1741. Petition of the city of Boston for license to repair Charles River Bridge on Charles River in said city. Granted Jan. 1, 1895.
1742. Petition of Henry M. Plummer and others for approval of plans for a bridge over Little River in the town of Dartmouth, as authorized by chapter 358 of the Acts of 1894. Granted Jan. 1, 1895.
1743. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to fill solid its pile bridge in Crystal Cove, northerly of Washington Avenue bridge, in the town of Winthrop. Granted Jan 11, 1895.
1744. Petition of Manuel Williams for license to build a pile wharf in Provincetown harbor in the town of Provincetown. Granted Jan. 11, 1895.
1745. Petition of the trustees of the Boston Real Estate Trust for license to construct foundations for an engine and boilers, and for a building, on Fort Point Channel in the city of Boston. Granted Jan. 11, 1895.
1746. Petition of Joseph A. Bowen for license to build a sea wall and to fill solid on Taunton River in the city of Fall River. Granted Jan. 11, 1895.
1747. Petition of the Staples Coal Company for license to build a sea wall and to fill solid on Taunton River in the city of Fall River. Granted Jan. 11, 1895.
1748. Petition of Josiah G. Munro for license to build a stone and timber pier in Mattapoisett harbor in the town of Mattapoisett. Granted Jan. 22, 1895.
1749. Petition of the town of Harwich for license to extend the jetty at the mouth of Herring River in said town. Granted Jan. 22, 1895.
1750. Petition of the Holyoke Water Power Company for approval of plans for a dam across the Connecticut River at South Hadley, as authorized by chapter 222 of the Acts of 1848 and chapter 6 of the Acts of 1859. Granted Jan. 23, 1895.

Nos.

1751. Petition of Horace H. Bigelow for license to build a foot bridge over Lake Quinsigamond in the city of Worcester. Granted Feb. 6, 1895.
1752. Petition of the Boston & Maine Railroad for license to build draw piers at its eastern division bridge on Saugus River in the city of Lynn and town of Saugus. Granted Feb. 7, 1895.
1753. Petition of Isaiah Spindell for license to build and maintain structures in Eel Pond at Woods Holl in the town of Falmouth. Granted Feb. 19, 1895.
1754. Petition of Walter O. Luscombe for license to build a sea wall and to fill solid in Woods Holl Great Harbor at Woods Holl in the town of Falmouth. Granted Feb. 19, 1895.
1755. Petition of the city of Boston for license to dump snow and ice into tide waters. Granted March 12, 1895.
1756. Petition of the Commercial Wharf Company for license to rebuild a portion of Commercial wharf in Boston harbor in the city of Boston. Granted March 13, 1895.
1757. Petition of Mary A. Harvey for license to extend her wharf, on piles, on Weymouth Fore River in the city of Quincy. Granted March 13, 1895.
1758. Petition of the Pigeon Cove Harbor Company for license to build a sea wall and to fill solid in Pigeon Cove harbor in the town of Rockport. Granted March 19, 1895.
1759. Petition of the Boston Asylum and Farm School for Indigent Boys for license to construct a pile and timber breakwater and a dolphin in Boston harbor at Thompson's Island in the city of Boston. Granted March 27, 1895.
1760. Petition of Hannah G. Shaw for license to build a sea wall and to fill solid on Swift's River in the town of Wareham. Granted April 8, 1895.
1761. Petition of the town of Harwich for license to fill solid a portion of Lower Herring River bridge on Herring River in said town. Granted April 8, 1895.
1762. Petition of Lucius M. Sheldon for license to build a dam or dike on the East Branch of Westport River in the town of Westport. Granted April 8, 1895.
1763. Petition of the town of Cottage City for license to build a dam or dike across the opening connecting Lake Anthony with Vineyard Sound in said town. Granted April 8, 1895.

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- Nos.
1764. Petition of the city of Boston for license to rebuild and extend the middle pier at the North Ferry in Boston harbor at East Boston. Granted April 8, 1895.
1765. Petition of Richard M. Swartout for license to build and maintain a sluiceway and tide gate in the present dam across a branch of the Apponagansett River in the town of Dartmouth. Granted April 24, 1895.
1766. Petition of Lemuel C. Ring for license to build a wharf on Merrimac River in the town of Bradford. Granted April 24, 1895.
1767. Petition of Annie E. Barker for license to fill solid in Boston harbor at East Boston. Granted April 24, 1895.
1768. Petition of Robert B. Wardwell for license to build a sea wall and to fill solid in Swampscott Bay in the town of Swampscott. Granted May 3, 1895.
1769. Petition of William H. Mears, trustee, for license to build a pile wharf in Quincy Bay, at Hough's Neck in the city of Quincy. Granted May 3, 1895.
1770. Petition of Joseph Stone for license to fill solid and to maintain a wharf on Mystic River in the city of Boston. Granted May 9, 1895.
1771. Petition of the Lynn & Boston Railroad Company for license to build a temporary pile bridge adjoining Chelsea bridge, on Mystic River in the cities of Boston and Chelsea. Granted May 9, 1895.
1772. Petition of Joel F. Sheppard for license to build a sea wall and to fill solid on Weymouth Fore River in the city of Quincy. Granted May 15, 1895.
1773. Petition of the firm of Ginn & Company for license to lay a pipe in Broad Canal, at First Street bridge in the city of Cambridge. Granted May 20, 1895.
1774. Petition of John Morrison and David Morrison for license to drive piles and make alterations at Pearson's wharf in Boston harbor in the city of Boston. Granted May 20, 1895.
1775. Petition of Arthur H. Wolcott for license to build a pile wharf in Boston harbor in the town of Winthrop. Granted May 20, 1895.
1776. Petition of Andrew J. Miller and others, trustees, for license to build a bulkhead and tide gate, and to fill solid in Quincy Bay in the city of Quincy. Granted May 20, 1895.

Nos.

1777. Petition of Henry M. Plummer and others for approval of plans for a bridge over Little River in the town of Dartmouth, as authorized by chapter 358 of the Acts of 1894. Granted May 20, 1895.
1778. Petition of the city of Boston for license to rebuild the draw foundations and to extend the draw piers of Chelsea bridge on the north channel of Mystic River in the cities of Boston and Chelsea. Granted May 20, 1895.
1779. Petition of John Parkinson and W. E. C. Eustis, trustees, for license to build and maintain a pile wharf and float stage in Buzzard's Bay in the town of Bourne. Granted May 22, 1895.
1780. Petition of the Brookline Gas Light Company for approval of plans for laying a gas main and siphon across Fort Point Channel, at Dover Street bridge in the city of Boston, as authorized by chapter 405 of the Acts of 1895. Granted May 29, 1895.
1781. Petition of Wm. Humphreys for license to widen and extend his wharf, on piles, in Marblehead harbor in the town of Marblehead. Granted June 4, 1895.
1782. Petition of the Sagamore Manufacturing Company for license to fill solid in Brightman's Cove in the city of Fall River. Granted June 4, 1895.
1783. Petition of Edward Turner and Costello C. Converse, trustees of the Boston Land Company, for license to fill solid and build culverts and tide or regulating gates in and over the tide waters of Belle Isle Inlet and Sales Creek, and to exclude tide water from marsh lands in the city of Boston and towns of Winthrop and Revere. Granted June 5, 1895.
1784. Petition of the New York, New Haven & Hartford Railroad Company for license to fill solid in Hull harbor in the town of Hull. Granted June 6, 1895.
1785. Petition of Rufus Smith and others for license to lay pipes, excavate canals and draw water from Lovers' Lake in the town of Chatham. Granted June 6, 1895.
1786. Petition of the Squantum Yacht Club for license to build and maintain a pile wharf and float stage in Quincy Bay in the city of Quincy. Granted June 19, 1895.
1787. Petition of William H. Fearing for license to build a pile wharf in Wareham harbor in the town of Wareham. Granted June 19, 1895.

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- Nos.
1788. Petition of George B. Wilbur for license to build and maintain a boat house and float stage, and to fill solid in Woods Holl Great Harbor in the town of Falmouth. Granted June 19, 1895.
1789. Petition of the Taunton Yacht Club for license to build a club house and to construct dolphins on Taunton River in the town of Dighton. Granted June 19, 1895.
1790. Petition of Albert H. Fuller and Irving C. Hammond for license to build a pile wharf on Onset Bay in the town of Wareham. Granted June 19, 1895.
1791. Petition of Horace S. Crowell for license to build and maintain a wharf and float stage in Woods Holl Great Harbor in the town of Falmouth. Granted June 20, 1895.
1792. Petition of Wilhelmina C. Clifford for license to build a wharf in Buzzard's Bay in the town of Dartmouth. Granted June 20, 1895.
1793. Petition of the Greenfield & Turner's Falls Street Railway Company for approval of plans for a bridge across Connecticut River between the towns of Montague and Deerfield, as authorized by chapter 358 of the Acts of 1895. Granted June 20, 1895.
1794. Petition of Albert Metcalf for license to extend his wharf, on piles, on Mystic River in the city of Boston. Granted June 21, 1895.
1795. Petition of H. Frances Dunning for license to drive piles, build a bulkhead and fill solid on Mystic River in the city of Somerville. Granted June 27, 1895.
1796. Petition of Andrew J. Miller and others, trustees, for license to build a bulkhead and to fill solid in Quincy Bay in the city of Quincy. Granted June 27, 1895.
1797. Petition of Michael Cashman for license to extend his wharf, partly solid and partly on piles, in Lynn harbor in the city of Lynn. Granted June 27, 1895.
1798. Petition of John F. Welch and Lester R. Taber for license to build and maintain a pile wharf and float stage on Weymouth Fore River in the town of Weymouth. Granted June 27, 1895.
1799. Petition of the city of Boston for license to repair the draw foundations of Charles River bridge on Charles River in the city of Boston. Granted July 1, 1895.
1801. Petition of Laura E. Phillips for license to build a pile wharf in Beverly harbor in the city of Beverly. Granted July 3, 1895.

- Nos.
1802. Petition of Vaughan D. Bacon and others for license to widen their wharf, on piles, in Barnstable harbor in the town of Barnstable. Granted July 10, 1895.
 1803. Petition of the Manchester Yacht Club for license to build a portion of a club house and to locate and maintain float stages in Manchester harbor in the town of Manchester. Granted July 10, 1895.
 1804. Petition of the Board of Park Commissioners of Boston for license to fill solid on Mystic River at Charlestown Heights in the city of Boston. Granted July 10, 1895.
 1805. Petition of the Board of County Commissioners of Bristol County for license to widen Broad Cove road and bridge on Taunton Great River in the towns of Dighton and Somerset. Granted July 10, 1895.
 1806. Petition of Ella S. Kellen for license to build and maintain a wharf and float stage in Marion harbor in the town of Marion. Granted July 10, 1895.
 1807. Petition of Hannah F. Rogers and others for license to build flumes, excavate a canal and draw water from Spectacle Pond in the town of Wareham. Granted July 10, 1895.
 1808. Petition of the Boston Rubber Company for license to build a pile structure on Chelsea Creek in the city of Chelsea. Granted July 10, 1895.
 1809. Petition of the town of Dighton for license to build a pile structure on Taunton Great River in said town. Granted July 15, 1895.
 1810. Petition of Stephen N. Breed & Company for license to extend their wharf in Lynn harbor in the city of Lynn. Granted July 15, 1895.
 1811. Petition of Wm. H. Goodwin for license to fill solid and to build and maintain a pile wharf and float stage in Salem harbor in the town of Marblehead. Granted July 24, 1895.
 1812. Petition of the receivers of the New York & New England Railroad Company for license to build a pile platform adjoining Pier No. 4 in Boston harbor at South Boston. Granted July 24, 1895.
 1813. Petition of John E. Searles for license to build and maintain a solid-filled wharf in Buzzard's Bay in the town of Marion. Granted July 31, 1895.
 1814. Petition of William H. Swift & Company for license to extend their wharf on Chelsea Creek at East Boston. Granted July 31, 1895.

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Nos.

1815. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to excavate an opening in its bridge across Belle Isle Inlet in the city of Boston and town of Revere, and to maintain said bridge. Granted Aug. 6, 1895.
1816. Petition of the Boston, Revere Beach & Lynn Railroad Company for license to fill solid its pile bridge across Belle Isle Inlet in the city of Boston and town of Winthrop. Granted Aug. 6, 1895.
1817. Petition of the Board of Park Commissioners of Boston for approval of plans for sea walls and solid filling in Boston harbor in the city of Boston, as authorized by chapter 282 of the Acts of 1893. Granted Aug. 6, 1895.
1818. Petition of the city of Boston for license to lay and maintain water pipes between Moon Island and Long Island, Long Island and Gallop's Island, Long Island and Rainsford Island, in Boston harbor, in the cities of Boston and Quincy. Granted Aug. 13, 1895.
1819. Petition of the city of Boston for license to rebuild the fender guard and repair the draw landing and easterly draw pier of Charles River bridge in the city of Boston. Granted Aug. 13, 1895.
1820. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for enlarging the pumping station on Chelsea Creek at East Boston, authorized by chapter 439 of the Acts of 1889. Granted Aug. 13, 1895.
1821. Petition of the Boston & Albany Railroad Company for license to widen the outer portion of Pier No. 6, Grand Junction wharves, at East Boston. Granted Aug. 13, 1895.
1822. Petition of the Boston & Albany Railroad Company for license to widen Pier No. 1 and to widen and rebuild a portion of Pier No. 6, Grand Junction wharves, at East Boston. Granted Aug. 20, 1895.
1823. Petition of the city of Cambridge for license to build a sea wall and to fill solid on Charles River between Binney Street and the canal near Bridge Street in said city. Granted Aug. 20, 1895.
1824. Petition of the Boston & Maine Railroad for license to build an abutment and draw pier and to fill solid at its bridge in Manchester harbor in the town of Manchester. Granted Sept. 17, 1895.

Nos.

1825. Petition of the New York, New Haven & Hartford Railroad Company for license to widen the draw pier in its bridge on Neponset River in the city of Boston. Granted Sept. 17, 1895.
1826. Petition of George L. Damon for license to fill solid on Charles River in the city of Cambridge. Granted Sept. 18, 1895.
1827. Petition of Nathaniel E. Harlow for license to fill solid and to build a pile platform in Plymouth harbor in the town of Plymouth. Granted Sept. 18, 1895.
1828. Petition of Thomas S. Kirkwood for license to build and maintain a wharf and float stage in Salem harbor in the town of Marblehead. Granted Sept. 18, 1895.
1829. Petition of the Board of Metropolitan Sewerage Commissioners for approval of plans for enlarging the pumping station on Mystic River authorized by chapter 439 of the Acts of 1889. Granted Sept. 18, 1895.
1830. Petition of the Grinnell Manufacturing Corporation for license to lay a 24-inch iron pipe in and under Acushnet River in the city of New Bedford. Granted Sept. 24, 1895.
1831. Petition of the city of Springfield for license to build out-fall sewers on Connecticut River in said city. Granted Sept. 24, 1895.
1832. Petition of William L. Trenholm for license to build and maintain a pile wharf in Vineyard Sound in the town of Falmouth. Granted Oct. 2, 1895.
1833. Petition of the estate of Stephen Whipple for license to build a bulkhead and to fill solid in Salem harbor in the city of Salem. Granted Oct. 2, 1895.
1834. Petition of the Whitman Mills for license to lay a 24-inch iron pipe, build a sea wall, excavate a basin and fill solid in Acushnet River in the city of New Bedford. Granted Oct. 2, 1895.
1835. Petition of the Board of Park Commissioners of Boston for license to fill solid in Dorchester Bay in the city of Boston. Granted Oct. 2, 1895.
1836. Petition of George Parker for license to build a pile wharf in Boston harbor at East Boston. Granted Oct. 7, 1895.
1837. Petition of the Old Colony Railroad Company for approval of plans for ferry slips on Acushnet River in the city of New Bedford and town of Fairhaven, as authorized and

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- Nos. required by chapter 392 of the Acts of 1894. Granted Oct. 10, 1895.
1838. Petition of Orlando E. Lewis for license to fill solid, build a pile wharf, and to dredge in Crystal Bay in the town of Winthrop. Granted Oct. 15, 1895.
1839. Petition of Orlando E. Lewis for license to fill solid, build a pile wharf, and to dredge a channel in Boston harbor in the town of Winthrop. Granted Oct. 15, 1895.
1840. Petition of Timothy A. Newhall for license to build a bulkhead and fill solid in Lynn harbor in the city of Lynn. Granted Oct. 21, 1895.
1841. Petition of the Cambridge Gas Light Company for license to lay a gas main across Broad Canal in the city of Cambridge. Granted Oct. 23, 1895.
1842. Petition of the firm of Slade, Gorton & Co. for license to widen and extend their wharf, on piles, in Gloucester harbor in the city of Gloucester. Granted Oct. 23, 1895.
1843. Petition of the West End Street Railway Company for license to widen its wharf, on piles, in South Bay in the city of Boston. Granted Oct. 23, 1895.
1844. Petition of the Commissioners on West Boston bridge for license to drive additional piles under West Boston bridge on Charles River in the city of Cambridge. Granted Oct. 23, 1895.
1845. Petition of Orlando E. Lewis for license to dredge and fill solid in Crystal Bay, northerly of Washington Avenue bridge, in the town of Winthrop. Granted Oct. 24, 1895.
1846. Petition of Delmont L. Weeks for license to fill solid in a basin connecting with Nantucket harbor in the town of Nantucket. Granted Oct. 24, 1895.
1847. Petition of Ellis H. Blackwell and Laureston E. Ames for license to build an ice break and to fill solid on Monument River in the town of Bourne. Granted Oct. 29, 1895.
1848. Petition of the Boston & Albany Railroad Company for license to rebuild Pier No. 1, Grand Junction wharves, at East Boston. Granted Oct. 29, 1895.
1849. Petition of the Nantasket Beach Steamboat Company for license to rebuild and enlarge its Pemberton Pier in Hull Bay in the town of Hull. Granted Oct. 29, 1895.
1850. Petition of Isaac Pratt, Jr., for license to widen his wharf, on piles, in Boston harbor at East Boston. Granted Oct. 31, 1895.

Nos.

1851. Petition of the city of Boston for license to lay an 8-inch water pipe below the bottom of Boston harbor, between Point Shirley and Deer Island, in the city of Boston and town of Winthrop. Granted Oct. 31, 1895.
1852. Petition of the Boston & Maine Railroad for license to fill solid a portion of Pennsylvania Pier in Salem harbor in the city of Salem. Granted Oct. 31, 1895.
1853. Petition of the Jewett Lumber Company for license to widen its wharf on Chelsea Creek at East Boston. Granted Nov. 7, 1895.
1854. Petition of the Onset Bay Grove Association for license to build and maintain a pile wharf and float stage in Onset Bay in the town of Wareham. Granted Nov. 7, 1895.
1855. Petition of Caroline A. Breed and Henry B. Sprague for license to maintain a pile platform and bulkhead in Lynn harbor in the city of Lynn. Granted Nov. 14, 1895.
1856. Petition of Charles S. Clark for license to drive piles for the support of a building on South River in the city of Salem. Granted Nov. 14, 1895.
1857. Petition of Emeline L. Kenrick for license to build a pile pier and to construct dolphins on Chelsea Creek at East Boston. Granted Nov. 25, 1895.
1858. Petition of Abigail Jacobs for license to build and maintain a fender guard in Provincetown harbor in the town of Provincetown. Granted Nov. 25, 1895.
1859. Petition of the Boston Transit Commission for approval of plans for a bridge over Charles River between the present Charles River bridge and the Fitchburg Railroad bridge in the city of Boston, as authorized and required by chapter 548 of the Acts of 1894. Granted Nov. 25, 1895.
1860. Petition of the West End Street Railway Company for license to dump snow and ice into tide waters. Granted Nov. 27, 1895.
1861. Petition of George L. Damon for license to build a pile platform on Charles River and Broad Canal in the city of Cambridge. Granted Nov. 27, 1895.
- 1861a. Petition of the Muddy Pond Company for license to build and maintain a flume and conduits and to draw water from Cooper's Pond in the town of Carver. Granted Nov. 27, 1895.

MISCELLANEOUS PERMITS.

The Board has granted during the year twenty-nine miscellaneous permits, in addition to the licenses for structures in tide waters, great ponds and Connecticut River, previously mentioned. These permits were for dredging; for the removal of material from certain beaches; for dumping material dredged from certain localities; and for authorizing the publication of notices by the city of Cambridge and the New York, New Haven & Hartford Railroad Company, in the name of the Board, for temporarily closing the canal near Bridge Street in Cambridge to the passage of vessels during the construction of a siphon across said canal, and for closing Fort Point Channel to the passage of vessels through the bridge of said company for the purpose of making necessary repairs to said bridge.

TIDE-WATER ASSESSMENTS AND HARBOR COMPENSATION FUND.

There was paid into the treasury of the Commonwealth during the year, under section 14 of chapter 19 of the Public Statutes, \$7,076.29, in payment for tide water displaced by work done under licenses granted by the Board, and \$265.50 in payment for gravel removed from Neponset River under permit from the Board, making a total of \$7,341.79 credited to the harbor compensation fund for Boston harbor.

The total expenditure from the fund during the past twenty-one years has been \$175,719.33, of which \$142,852.28 has been for dredging, most of which has been done in the upper harbor.

RECEIPTS FROM GRANTS OF PUBLIC LANDS.

There was paid into the treasury of the Commonwealth during the year, under the provisions of section 16 of chapter 19 of the Public Statutes and chapter 318 of the Acts of 1888, for grants of rights and privileges in tide waters and great ponds under licenses from the Board, the sum of \$145. Payment for grants of tide-water lands of the Commonwealth was first required by chapter 284 of the Acts of 1874, and

since the passage of that act the total amount received and paid into the treasury of the Commonwealth is \$379,197.03. The amount received during the year from rents of the Commonwealth's lands at South Boston, and paid into the Commonwealth's flats improvement fund, is \$288, as already stated.

WORK OF THE UNITED STATES IN HARBORS OF THE
COMMONWEALTH.

The Board takes pleasure in appending to this report statements made by Lieut.-Col. Samuel M. Mansfield, Corps of Engineers, U. S. A., who is in charge of river and harbor improvements in eastern Massachusetts; and by Maj. D. W. Lockwood, Corps of Engineers, U. S. A., who is in charge of similar improvements in southern Massachusetts; being the work accomplished by the United States government in the rivers and harbors of this Commonwealth during the year.

The foregoing report is respectfully submitted by

WOODWARD EMERY,
JOHN I. BAKER,
CHARLES H. HOWLAND,
Commissioners.

DEC. 1, 1895.

STATEMENT

OF

LIEUT.-COL. S. M. MANSFIELD, CORPS OF ENGINEERS, U. S. A.

[Referred to in the foregoing report of the Board.]

DEC. 14, 1895.

*The Harbor and Land Commissioners,
Commonwealth of Massachusetts, Boston, Mass.*

GENTLEMEN : — In accordance with your request of this date, I have the honor to furnish the following summary of the work done by the government during the year 1895, in those rivers and harbors of Massachusetts which are under my charge : —

1. *Newburyport Harbor.*

The project for the improvement of the harbor has not been changed. No work was done during the year on the north jetty or Plum Island dike.

During the year 14,251 tons of rubble-stone were deposited in the south jetty, under a contract with the Rockport Granite Company. It is now 1,540 feet long.

The annual survey of the bar was made in June, 1895. No essential change in the condition of the channel was found; its axis had swung still farther to the southward, but this movement will undoubtedly be checked by the extension of the south jetty.

2. *Harbor of Refuge, Sandy Bay.*

The project remains unchanged.

During the year, under a contract with the Cape Ann Granite Company, 40,000 tons, approximately, of rubble-stone have been deposited in the substructure of the breakwater.

3. *Gloucester Harbor.*

No change in the project was made during the year.

All the dredging and removal of ledges proposed has been effected, and 45,000 tons of rubble-stone have been deposited in

the substructure of the breakwater running from Eastern Point to Round Rock Shoal, under a contract with the Rockport Granite Company. About 500 feet of this breakwater substructure has been completed.

4. *Manchester Harbor.*

The project for the improvement of this harbor has been completed, and the work dropped.

5. *Salem Harbor.*

The project for the improvement of this harbor is completed, and the work has been dropped.

6. *Lynn Harbor.*

No change has been made in the project.

During the year 32,000 cubic yards were dredged from the inner channel, under a contract with Mr. Augustus B. Martin; 3,700 feet of the inner channel are completed.

7. *Winthrop Harbor.*

The project for the improvement of this harbor is completed, and the work dropped.

8. *Boston Harbor.*

No change was made during the year in the project for the improvement of this harbor.

During the year 149,479 cubic yards were dredged from "The Narrows," under a contract with Mr. Chas. H. Souther and Mr. Augustus R. Wright. The main ship channel is now 27 feet deep at mean low water, 1,000 feet wide from the entrance of the harbor to "Bug" Light, 800 feet wide to the passage between George's and Gallop's islands, and thence through "The Narrows" 550 feet wide. A free use of this increased depth cannot be made until the ledges uncovered by the dredging are removed, under the contract with Messrs. Townsend & Johnston; the contract calls for the removal of 8,772 cubic yards, and during the year about 600 cubic yards have been removed.

9. *Hingham Harbor.*

The project for the improvement of this harbor is completed, and the work dropped.

10. *Scituate Harbor.*

During the year, under the contract with the Pigeon Hill Granite Company, 9,394 tons of rubble-stone were deposited in the south jetty. It is completed for a distance of 450 feet.

11. *Plymouth Harbor.*

The project for the improvement of the harbor is completed; no operations were in progress during the year, and the works of preservation on Long Beach are in fair order.

12. *Kingston Harbor.*

The project for the improvement of this harbor is completed, and the work has been dropped.

13. *Wellfleet Harbor.*

No change during the year.

14. *Provincetown Harbor.*

During the year repairs were made to the bulkheads protecting Long Point, near the Wood End Light and near Abel Hill.

15. *Chatham Harbor.*

No change during the year.

16. *Essex River.*

During the year, under a contract with the Columbian Dredging Company, 47,008 cubic yards were dredged, and the improved channel is 25 feet wide, 4 feet deep at mean low water, to the head of navigation.

17. *Merrimac River.*

During the year a survey of the river was made from its mouth to the city of Haverhill, and a project for the improvement of this part of the river will be submitted as soon as it can be prepared.

18. *Powow River.*

A contract is in force with Mr. Augustus R. Wright to dredge 64,000 cubic yards from this river. Operations were not commenced under this contract until late in the season, owing to the

difficulty in finding a suitable dumping ground ; and as during the year but about 3,500 cubic yards were dredged, the condition of the improvement is essentially unaltered from last year.

19. Ipswich River.

The project for the improvement of this river is completed, and the work dropped.

20. Weymouth River.

Under a contract with Messrs. Perkins & White, 35,611 cubic yards were dredged from this river during the year. The improved channel is now 6 feet deep at mean low water, 60 feet wide to the wharves at Weymouth landing, thence to Braintree bridge 40 feet wide, and above the bridge 25 feet wide.

21. Mystic and Malden Rivers.

During the year, under a contract with Mr. Chas. H. Souther, 75,229 cubic yards were dredged from these rivers.

In the Mystic River the improved channel is 6 feet deep at mean low water, 100 feet wide to the first turn above Dunning's wharf, and for a distance of 1,500 feet above this turn 4 feet deep and at least 50 feet wide.

In Malden River the channel has been made at least 75 feet wide and 12 feet deep at mean high water to the first bridge.

22. Removal of Wrecks.

An advertisement has been issued, inviting proposals for the removal of the wreck of the schooner "Lillie" from Boston harbor.

Very respectfully, your obedient servant,

S. M. MANSFIELD,
Lieutenant-Colonel of Engineers.

STATEMENT

OF

MAJ. D. W. LOCKWOOD, CORPS OF ENGINEERS, U. S. A.

[Referred to in the foregoing report of the Board.]

DEC. 16, 1895.

*The Harbor and Land Commissioners, Commonwealth of Massachusetts,
Boston, Mass.*

GENTLEMEN:—In accordance with your request of the 14th instant, I have the honor to furnish the following summary of the work done by the government during the fiscal year ending June 30, 1895, in those rivers and harbors of Massachusetts which are under my charge.

These works were under the charge of Maj. W. H. Bixby, Corps of Engineers, U. S. A., up to June 8, 1895, and from that time until the close of the fiscal year were under the charge of Lieut. W. W. Harts, Corps of Engineers, U. S. A.

1. Taunton River.

Nothing was done. A contract is in force with the Columbia Dredging Company of Fall River, Mass., for continuing the dredging, covering about \$3,000 worth of work, to be done next spring.

2. Hyannis Harbor.

Nothing was done during the year. A contract is in force with the Hartford Dredging Company of Hartford, Conn., covering about \$2,000 worth of dredging, to be done next season.

3. Nantucket Harbor.

Under contract with Mr. Humphrey Toomey of Guilford, Conn., 446 tons of stone have been placed in the east jetty.

4. Edgartown Harbor.

Nothing was done. A contract is in force with the Hartford, Dredging Company of Hartford, Conn., for about \$1,200 worth of dredging, to be done next season.

5. *Vineyard Haven Harbor.*

Nothing was done. It is proposed to continue work next season, with such funds as may be available, on the work of protection to the east and west chops.

6. *Wareham Harbor.*

Nothing was done in the way of actual work, owing to a lack of funds. A survey for further improvement has been made and report and estimate submitted.

7. *New Bedford Harbor.*

Nothing was done except the making of a survey for further improvement. The report and estimate based upon this survey have been submitted. A contract is in force with the Hartford Dredging Company of Hartford, Conn., covering about \$5,000 worth of dredging, to be done next season, in widening and deepening the channel.

8. *Canapitsit Channel.*

Nothing was done. A contract is in force with the Hartford Dredging Company of Hartford, Conn., covering about \$3,500 worth of dredging, to be done next season.

9. *Harbor of Refuge at Woods Holl.*

The work at this place during the year consisted of repairs to the United States Fish Commission pier and wharves, due to injury by storms, etc.

10. *Tarpaulin Cove, Naushon Island.*

A survey, with report and estimate of cost of improving this locality, have been made and submitted to the chief of engineers, U. S. A.

11. *Wrecks.*

During the last fiscal year the following wrecks were removed, so as to no longer obstruct navigation : —

An unknown wreck (supposed to be the "White Foam") of about sixty tons gross tonnage, from the mouth of Parker's River, Mass.

"Shamokin," a barge of about eight hundred and forty tons gross tonnage, from Pollock Rip Slough.

A portion of an old wreck (name unknown) from Woods Holl harbor, Mass.

A portion of a wrecked vessel (supposed to be the "Golden Rule") from near Naushon Island in Buzzards Bay, Mass.

"Dora M. French," a schooner of some two hundred and fifteen tons gross tonnage, from the western entrance to Vineyard Sound, Mass.

"Mary J. Castner," a schooner of four hundred and thirty-three tons gross tonnage, from Pollock Rip Slough.

"Light of the East," a schooner of one hundred and forty-seven tons gross tonnage, from Nantucket Sound, a few miles south-east of the Bass River Light Station on the Kill Pond Bar.

"Maria Adelaide," a schooner of about one hundred and twelve tons gross tonnage, from the channel of the entrance to Cuttyhunk Pond, Mass.

"E. K. Hart," a schooner of some ninety tons gross tonnage, from the middle of Tarpaulin Cove harbor, Mass.

"Julia E. Pratt," a schooner of two hundred tons gross tonnage, from Nantucket harbor, Mass.

"Ellen Morrison," a schooner of one hundred and seventy-one tons gross tonnage, from near Monomoy Point Light-house, Mass.

An unknown wreck (believed to be the "Harry L. Whiton") near Brown's Ledge, Mass.

"Royal Arch," a schooner of four hundred and twenty-two tons gross tonnage, from Pollock Rip, Mass.

An unknown wreck from Bearse's Shoal, near Pollock Rip, Mass.

An unknown wreck (believed to be the "T. P. Dixon") from Vineyard Sound, between the Vineyard Sound Light Ship and the Sow and Pigs Reef Buoy.

An unknown wreck from Chatham Roads, Mass.

"Josiah R. Smith," a schooner of seven hundred and four tons gross tonnage, from Vineyard Sound, a few miles south-east of the Cuttyhunk life-saving station, Mass.

"Oneonta," a barge of about five hundred and eighty-six tons gross tonnage, from Pollock Rip, Mass.

Very respectfully,

D. W. LOCKWOOD,
Major, Corps of Engineers, U. S. A.

REPORT

OF THE

SUPERINTENDENT OF THE PROVINCE LANDS.

[Referred to in the foregoing report of the Board.]

To the Board of Harbor and Land Commissioners.

GENTLEMEN : — As superintendent of the province lands I respectfully submit the following report for the year ending Nov. 30, 1895.

In my report to you for the year 1894 I gave a detailed statement of the work done upon the province lands, particularly in regard to the planting of trees and shrubs, etc., and further stated that it would be impossible to make a fair estimate of the value of the work done in that line until the effect of the winter storms and winds could be known.

The winds and storms of the winter of 1894 and 1895 were severe and very destructive, and, as our planting in the season of 1894 was done in the most exposed and barren section of the lands, it was in consequence badly damaged by being either buried by the drifting sands or cut and destroyed.

The Scotch broom, of which a considerable quantity was planted, was entirely destroyed by the cutting of the sand ; the young silver poplars were stripped entirely of bark and killed to the ground, but new growth came from the root, and many of them have made very satisfactory growth during the past season ; the willows and other varieties suffered severely from the same cause, and a large proportion of them were killed. My conclusion is, after observing the effects of the storms and winds of last winter upon this work, that it would be useless to do more planting of trees and shrubs at present in these exposed and barren sections, and that some method must be adopted to hold the sands in place before tree and shrub planting can be carried on with any degree of success.

Therefore, in accordance with suggestions made in my report for 1894, a section of the northern range of sand hills has been planted with marram or beach grass, which is considered one of the best sand binders, and is capable of withstanding the whipping of the wind and cutting of the sand. Commencing at the extreme

westerly point of the range, the work has proceeded in an easterly direction along the northern slope, a distance of 2,900 feet, covering about 13 acres. This work up to the present time appears to be a success, the grass having taken root readily and made good growth during the season; and, although we have had some severe gales, it has stood the test and kept the sand from moving.

Along the foot of this slope and parallel with this beach grass work there have been planted about 2,300 willow trees of various kinds, about 1,000 silver poplars and about 2,500 young pines of the native variety (*Pinus rigida*); and in addition to these about 20,000 willow slips have been planted among the beach grass that was set out. The season has been very favorable for this planting, and the results fully meet my expectations; a large percentage are living, and appear to be in a very healthy and vigorous condition. With the protection afforded by the beach grass work, I see no reason why they should not continue to thrive and form the nucleus of a good forest growth.

In connection with this work a nursery has been established, in which have been planted seeds and slips of a variety of trees, from which I hope to get a supply of stock for transplanting as the work progresses. The work in the nursery has been very successful thus far, and there are growing there from 200,000 to 250,000 young trees, consisting of pines, locust, alder, birch, hornbeam, ailanthus, maples and shrubs. The larger portion of these young trees are pines, which I regard as the most suitable for the work in hand. This stock, after one or two years' growth in the nursery, will be in condition for transplanting, and by a slight extension of the nursery a supply will be available sufficient to meet the demand for trees and shrubs as they will be needed from time to time. In establishing this nursery much valuable assistance and advice has been received from Mr. Leonard W. Ross, landscape engineer, of Boston.

During the year the road which was commenced last year has been extended through Nigger Head, making a continuous driveway from near bound "I" to the sand hills, a distance of a little over one mile; this road is much frequented by the public, and has given much satisfaction; it is wearing well, and with occasional light repairs will last many years. Some of the other roads leading through the wooded portion of the lands have been repaired and improved, making them safe and convenient for public travel.

A much larger portion of the appropriation has been expended in planting operations the past season than in road building, as it is impracticable to extend a road over the sand hills until the sands

are covered with some vegetable growth sufficient to keep them in place; and I feel satisfied that the method pursued this season, that of beach grassing and in connection therewith the planting of trees and shrubs, is the most feasible. This is a slow process, and it will take years to accomplish the complete reclamation of these waste lands; but it seems to be the best and only sure method of bringing about the desired results. I would recommend the continuance of the work on these lines. In continuing the work as indicated, the length of time required to accomplish all that is desired will depend largely upon the amount appropriated each year; double the amount appropriated for 1895 could be profitably expended annually upon this work for several years.

Respectfully submitted,

JAMES A. SMALL,
Superintendent Province Lands.

PROVINCETOWN, MASS., Dec. 1, 1895.

UNITED STATES DEPARTMENT OF AGRICULTURE,
DIVISION OF FORESTRY,
WASHINGTON, D. C., March 25, 1895.

MR. W. EMERY, *Chairman, Board of Harbor and Land Commissioners,*
Boston, Mass.

DEAR SIR:—In reply to your favor of the 21st inst., requesting information on the fixing of sand dunes at Provincetown, permit me to say that we have received communications from Mr. L. W. Ross, landscape engineer, on the same subject during the past year, with reference to specific plants for sand planting. For the larger discussion which you evidently desire, it is a matter of regret that experiments in America have been of such a desultory nature as to preclude the possibility of definite advice. In the first edition of Flint's "Grasses and Forage Plants," published in 1860, a quite extended account of the fixing of the sands of Provincetown by planting the beach grass (*Ammophila arundinacea*) is given (pages 49–55). And it may safely be considered that plants of this character should be the precursors of woody plants in sand planting. You may find it necessary, as a prerequisite to planting of any character, to quiet the shifting sands in some degree by artificial means, in order for plantings to get a foothold.

An indispensable measure is protection against preventable disturbances, such as cattle grazing, driving and even walking over

the land. All the sand dunes exposed to windward, which offer too much surface to the wind and are so steep that they cannot hold the sand when dry, should be first properly sloped or levelled, and sink-holes or depressions should be as much as possible filled up. For this purpose brushwood or rail fences may be used, which catch the sand when moved by the wind, and thus raise the surface.

When dealing with sand dunes at the sea-shore, it is desirable to first cut off to some extent the supply of sand constantly brought from the sea. This is done by raising the shore or front in the same way, with a tolerably steep grade, which, while having slope enough not to be endangered by underwashing, forces the waves to carry back the sand they brought up. This is most simply done by establishing an artificial front or forward dune. This forward dune should not be more than one hundred and fifty to two hundred and fifty feet from the shore at calm sea and average level, and is formed by running two parallel fences along the shore, loosely placed, made of brushwood, hedge-fashion, six feet apart, and so high that the top of each may be say eight to ten feet above average water level. These hedges, which should be about four to six feet high, if necessary braced up by post and rail, are expected during the summer to catch the shifting sand between, in front and rear, and thus to form the forward dune.

Should this dune not be high enough to keep off or at least depress sufficiently the sea winds and their effects upon the sand masses beyond, especially if these are extensive, a second dune, the so-called "high dune," established in a similar manner, only higher, and parallel with and behind the first, becomes necessary.

Next it becomes necessary to make the dune effective in holding back the sand which is constantly added to it by the action of the wind and sea. This is done by suitable projections which will catch the sand. It used to be done in Holland by planting straw wisps (long straw folded in the middle) into the sand, in rows one step apart and one step in the row. This operation had to be repeated after the first straw was covered with sand. While expeditious, this method is not only expensive but also not permanent, and, on the German coast, has therefore been supplanted by the use of sand grasses, which, after being covered, grow through the sand to the surface, and keep the dune permanently in proper condition. The best grass for the purpose has been found to be *Ammophila arenaria*, which is easily and successfully transplanted.

For planting near the shore, at the foot of the dune, where the surf is strong, another grass, *Elymus arenaria*, is used, which is

better capable of withstanding the washing of the sea. I do not know whether an equivalent to this is found in this country.

The planting is done in rows along the dune four to six feet apart, with crosswise alternate rows every eight feet. This "net planting," in which, by the way, the meshes may be kept wider or smaller according to the steepness of the slope, has the advantage of resisting the wind from all directions and preventing the blowing out of the sand between the rows. The meshes may also be more or less filled out with plants, to give more body to the plantation. The crest of the dune, or rather the depression which will be found there (between the two fences), takes one row, and two or three rows are placed on the sea side, and perhaps several rows on the leeward side. The disposition of the rows, distance, etc., must of course be determined according to local conditions.

The distance in the row is best one and one-half to two feet. The planting is done by opening a ditch one foot deep (or deeper, if the sand is high and dry), and setting the plants in this, like cabbage. The plant material is gathered by digging or pulling it from its native habitat, but it can be grown from seed in seed beds near the shore.

In selecting plant material, it may be dug, or, if two or three rooting nodes are to be secured, pulled; and such only should be chosen as look fresh. Any season is good for transplanting, but of course a wet season following the planting is more favorable. By the runners of the grass the sand is soon covered with a sward.

When in this manner the shifting sand has been quieted, reforestation can be resorted to, to keep it permanently and securely in place.

As the work of tree planting on such sites must be largely experimental, I submit herewith a list of trees and shrubs that may be tried with fair prospects of success, the most promising in each list being first named, and the others arranged in order.

It should be borne in mind that mass planting, *i. e.*, plantations of great length and breadth, made of trees set close, with low-growing forms in the margins, are much more apt to succeed than widely spaced plantations of small extent, because the close-planted trees will afford mutual protection.

Wherever the forward dune is to be interrupted or terminated, a gradual slope must be provided for, by gradual sloping of the catch fences and by turning them inland. Where natural dunes exist and are to be utilized, the uneven depressions and hillocks must be removed; this is done by using the wind as motive power. To get rid of undesirable hillocks, these are cleared of all that

may hold the sand; to fill depressions, the grass is planted or catch fences placed in them, and the wind soon does the rest.

Above all, the dune must be constantly watched and any small damage repaired at once, since small defects are very rapidly enlarged, and prompt action can prevent this.

Hoping to have given you at least a useful starting point in your inquiry, I am,

Yours very respectfully,

CHARLES A. KEFFER,
Acting Chief.

List of Trees and Shrubs for Planting on Sand Dunes.

Trees : —
Pinus rigida.
P. Banksiana.
P. maritima.
Thuja occidentalis.
Taxus baccata.
Cupressus macrocarpa.
Populus alba.
P. monilifera.
P. candicans.
Salix alba.
Ailanthus glandulosa.
Celtis occidentalis.
Platanus occidentalis.
Quercus rubra

Ulmus sp.
Tilia sp.
Fagus ferruginea

Small trees : —
Tamarix amurensis.
Ilex opaca.

Shrubs : —
Berberis vulgaris.
Ligustrum vulgare.
Juniperus communis.
Ceanothus Americanus.
C. ovatus.
Spiræa opulifolia.

UNITED STATES DEPARTMENT OF AGRICULTURE,
DIVISION OF AGROSTOLOGY,
WASHINGTON, D. C., Dec. 11, 1895.

Mr. WOODWARD EMERY, *Commonwealth Building, 65 Bowdoin Street
Boston, Mass.*

DEAR SIR : — In reply to your favor of December 6, asking my impressions relative to the work you have undertaken in reclaiming the sand barrens and preventing the drifting of the sands of province lands, I would say that during my brief visit there I became much interested in what you are trying to do, and was very favorably impressed with the work which Captain Small has already done. As you say, it is a novel undertaking in this country, and the conditions are peculiar, but they are just such conditions as to test the possibilities of reclaiming such lands to the utmost. The work which your superintendent of province lands has in hand is of wide interest, both along our sea coasts and the shores of the Great Lakes. The peculiar conditions exist-

ing at Cape Cod have been long under the direct observation of Captain Small, and his account of the movements of the sands or sand dunes on the province lands was exceedingly interesting to me. He has started in to accomplish the results desired with a full knowledge of the requirements, and I believe by the most intelligent methods. I have made no study of the possible use of certain trees or shrubs in this work, but I know that they are used and highly valued. I was particularly interested in his use of beach grass, and in his apparent success in transplanting it to points where, from its peculiar habits, it would be most useful.

I am sorry I have not at hand a book possessed by a friend of mine here, upon the subject of holding drifting sands. It is a Danish work, more than a hundred years old, and contains some curious pictures, illustrating the setting out of beach grass and sea lyme-grass and certain species of willows. If these illustrations would interest you, I could have them copied by photography, and send them to you. I venture to enclose some small photographs made by myself while at Provincetown.

In regard to suggestions which you request, I am unable to offer any, but can only express the hope that nothing may interfere with your carrying out the plans and work you have undertaken.

Yours very truly,

F. LAMSON-SCRIBNER,
Agrostologist.

REPORT

OF

E. C. AND E. E. DAVIS, ENGINEERS.

[Referred to in the foregoing report of the Board.]

To the Honorable Board of Harbor and Land Commissioners of Massachusetts, WOODWARD EMERY, Esq., Chairman.

GENTLEMEN:—The following is our report upon the work done the past season in extending the protective works commenced in 1894 on the westerly bank of the Connecticut River in the town of Agawam, in accordance with the provisions and appropriations made in chapter 67 of the Resolves of the Legislature of 1895.

In the prosecution of the work this year we have followed the directions and suggestions of your Board, given last summer, and have extended the work done in 1894 512 feet up the river, to a point where the bank is sufficiently protected by the natural growth of trees and brush thereon. The balance of the work done this season, after completing this reach, has been from the point where the work was begun in 1894, down the river a distance of 362 feet.

The same general plan of protection and methods of construction adopted last year have been followed this year, with which your Board is already familiar from frequent visits to the work while in progress, and which are fully described in our report of 1894.

The slope of the bank has been made this year three to one instead of two to one, as last year, and the coping at the top of the riprap is set two feet above extreme high-water mark of last spring's freshet.

A contract for furnishing and delivering stone for the riprap work was made with Mr. Fred P. Stanton of Huntington, Mass., at \$1.83 per cubic yard, and he has fulfilled all the requirements of the contract on his part in a satisfactory manner.

There have been used this season 384.525 cubic yards of stone, costing \$703.62 delivered at the river bank.

A tract of 3.04 acres of willows for mats was bought in Long-meadow of Mr. John D. Colton, 2d, at \$15 per acre, costing \$45.60.

We have left, of this tract, about one-half an acre, which will be available should the work be extended another year.

The entire force of men employed this season have been residents and taxpayers of Agawam, with Mr. W. C. Campbell as foreman, under whose supervision and direction the work has progressed in a highly satisfactory manner, every man seeming to fully appreciate the assistance granted by the State in protecting the highway and property of his town.

Work was commenced August 12 and closed November 4.

There have been protected this season 932 feet in length of river bank, covering 4,403 square yards of surface, at a cost of about 64½ cents per yard, the total expenditure this season being \$2,840.56, leaving an unexpended balance of the appropriation — \$3,000 — of \$159.44 for setting willows in the spring, and repairs, if any are necessary.

The suggestion made in our report of 1894, that the town of Agawam be required to raise the grade of the highway against the river bank to high-water mark, between the Calla Shasta grounds and where our work was commenced last year, as a measure of safety for any protective works that might be placed there, has been met and fully complied with by the town, at their own expense, and we feel confident that any danger from overflow on the crest of the works at this place has been removed.

We recommend for next year that the work be extended down the river to the line of the Calla Shasta grounds a distance of 420 feet, thereby making a continuous line of protection 2,012 feet in length, and covering the entire reach of the highway at the place endangered by the action of the river.

The section of the river bank mentioned in our report of 1894, immediately below the homestead of James Green, should also receive attention next year, as the river bank line advanced several feet towards the highway at this place during the high water of last spring.

Respectfully submitted,

E. C. AND E. E. DAVIS,

Engineers.

NORTHAMPTON, MASS., NOV. 15, 1895.

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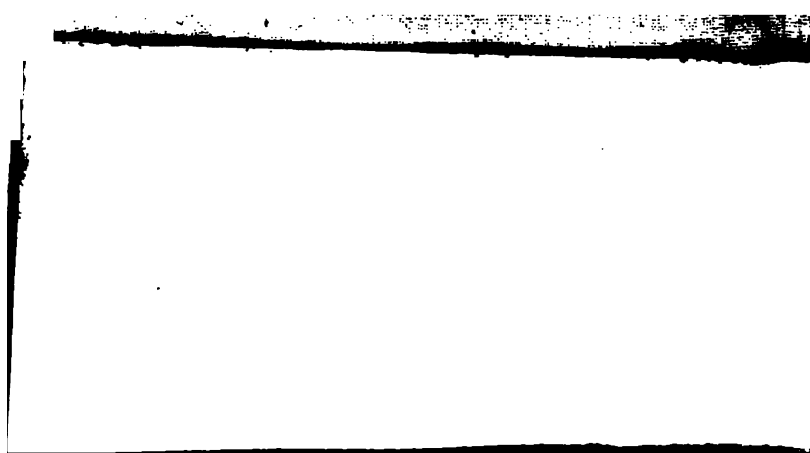
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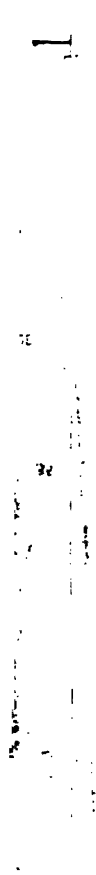
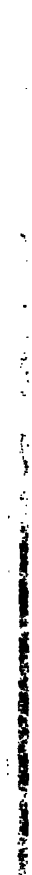




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APPENDIX.

[A.]

[See page 7 of this report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS TWENTY-FIRST DAY OF NOVEMBER, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FIVE, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND HUGH FARRELL OF SOMERVILLE IN SAID COMMONWEALTH, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for protecting bulkhead on the northerly front of the South Boston flats.

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows:—

The work to be done consists of placing stone riprap against the bulkhead on the northerly face of the South Boston flats, at and near the pier which was formerly the elevating station of the New England Dredging Company.

The length of bulkhead to be protected is 170 feet. The exact location is shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan showing the location of bulkhead to be protected by stone riprap. Nov. 18, 1895. Scale, $\frac{1}{2400}$."

The stone riprap is to be placed on the flats against the northerly or outer side of the bulkhead, and is to be 5 feet high against the bulkhead. The top surface is to slope on a regular grade from a point on the bulkhead 5 feet above the existing surface, down to the existing surface of the flats, at a point 15 feet from said bulkhead. The stones on the surface of the riprap shall be placed by

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hand, in as compact a manner as possible, and in accordance with the lines and grades marked by the engineer.

It is estimated that 252 cubic yards of stone riprap will be required to do this work. The stone for the riprap is to be taken from where it now lies opposite the bulkhead, next to and easterly of the bulkhead which is to be protected, at such places and to such extent as shall be directed from time to time by the engineer. In taking said stone, the party of the second part will not be required to take any pieces larger than can be readily handled by two men.

All the work shall be done subject to the instructions given by the engineer, and to his satisfaction.

The work shall be commenced at once and shall be completed on or before the fifteenth day of December, 1895, and will be paid for upon its completion.

The word "engineer" as used herein means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of two hundred fifty-seven dollars (\$257), the same to be in full compensation for all the work and other things done, furnished, performed and completed as aforesaid.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council; and the said Hugh Farrell has hereunto set his hand and seal.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY,	}	<i>Harbor and Land Commissioners.</i>
JOHN I. BAKER,		
CHAS. H. HOWLAND,		

HUGH FARRELL. [SEAL.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, Nov. 27, 1895. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[B.]

[See page 13 of this report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS NINETEENTH DAY OF FEBRUARY, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FIVE, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND THE EASTERN DREDGING COMPANY, A CORPORATION ESTABLISHED UNDER THE LAWS OF THE STATE OF MAINE, AT PORTLAND IN SAID STATE, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for deepening by dredging an area in Boston harbor opposite the Cunard wharf in East Boston, all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth:—

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows:—

The area to be dredged lies in front of the Cunard wharf in East Boston, and extends from a line 50 feet outside of and parallel with the harbor line to the main channel of the harbor, and from a line drawn from the south-easterly corner of the Eastern Railroad wharf to a line drawn from the south-west corner of Pier No. 1 of the Grand Junction Railroad wharves. It contains about 215,100 square feet. The location and dimensions of this area are more exactly shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of area to be dredged off Cunard wharf, East Boston, January, 1895, scale $\frac{1}{800}$." Said plan is referred to and made a part of these specifications.

The amount of material on the above area, between the present bottom and the plane of 27 feet below mean low water, is about 27,500 cubic yards.

The least present depth of water on the above area is about 22 feet at mean low water, and the average cut is about 3.3 feet.

All of the above-described area is to be dredged so that it shall have, when the work is completed, a depth of not less than 27 feet below the plane of mean low water.

The banks at the edges of the above area to be sloped off sufficiently to maintain the required depth over the whole of said area, and no extra payment or allowance to be made for such sloping nor for any excavation below the required depth.

The material excavated to be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Light; or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract, without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct; but bidders must examine for themselves, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid and materials for giving or indicating lines and grade to be furnished by the party of the second part at its own expense; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion, and to be fully completed on or before the first day of June, 1895.

Estimates to be made by said engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of 75 per centum of the proportional part of the contract price applicable to such work, as computed by said engi-

neer; the remaining 25 per centum to be paid upon the final completion and acceptance of the whole work.

If the party of the second part refuses or neglects to prosecute the work, or in any other respect fails to carry out the provisions of the contract, said Board may annul the same, and contract anew with other parties, without prejudice to its claim for damages arising from breach thereof.

The word "engineer" as used herein means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

The words "party of the second part" mean the corporation contracting to do the work, or its agent in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of eleven thousand nine hundred and fifty dollars (\$11,950), said sum to be in full therefor, and to be paid at the times, and in the manner, and upon the terms and conditions, set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council; and the said Eastern Dredging Company, by George E. Runyan, its treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY,	} Harbor and	
JOHN I. BAKER,		Land
CHAS. H. HOWLAND,		Commissioners.

EASTERN DREDGING COMPANY,

By GEO. E. RUNYAN,	[SEAL
Treasurer.	OF EASTERN
	DREDGING CO.]

In Council, Feb. 28, 1895. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

The least present depth of water on the above area is about 22 feet at mean low water, and the average cut is about 3.3 feet.

All of the above-described area is to be dredged so that it shall have, when the work is completed, a depth of not less than 27 feet below the plane of mean low water.

The banks at the edges of the above area to be sloped off sufficiently to maintain the required depth over the whole of said area, and no extra payment or allowance to be made for such sloping nor for any excavation below the required depth.

The material excavated to be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Light; or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract, without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct; but bidders must examine for themselves, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid and materials for giving or indicating lines and grade to be furnished by the party of the second part at its own expense; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion, and to be fully completed on or before the first day of June, 1895.

Estimates to be made by said engineer of the amount of work done up to the end of each calendar month, and payment to be made thereon of 75 per centum of the proportional part of the contract price applicable to such work, as computed by said engi-

neer; the remaining 25 per centum to be paid upon the final completion and acceptance of the whole work.

If the party of the second part refuses or neglects to prosecute the work, or in any other respect fails to carry out the provisions of the contract, said Board may annul the same, and contract anew with other parties, without prejudice to its claim for damages arising from breach thereof.

The word "engineer" as used herein means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

The words "party of the second part" mean the corporation contracting to do the work, or its agent in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of eleven thousand nine hundred and fifty dollars (\$11,950), said sum to be in full therefor, and to be paid at the times, and in the manner, and upon the terms and conditions, set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council; and the said Eastern Dredging Company, by George E. Runyan, its treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY,	}	<i>Harbor and Land Commissioners.</i>
JOHN I. BAKER,		
CHAS. H. HOWLAND,		

EASTERN DREDGING COMPANY,

By GEO. E. RUNYAN,	[SEAL OF EASTERN DREDGING CO.]
<i>Treasurer.</i>	

In Council, Feb. 28, 1895. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[C.]

[See page 14 of this report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS TWENTY-THIRD DAY OF JULY, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FIVE, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND THE EASTERN DREDGING COMPANY, A CORPORATION ESTABLISHED UNDER THE LAWS OF THE STATE OF MAINE, AT PORTLAND, IN SAID STATE, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for deepening by dredging an area in Boston harbor opposite Dock No. 6, Grand Junction wharves, East Boston, all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth.

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows:—

The area to be dredged lies in front of Dock No. 6, between Piers Nos. 5 and 6, Grand Junction Railroad wharves in East Boston, and extends from a line 50 feet outside of and parallel with the harbor line to the main channel of the harbor, and is 165 feet wide at its northerly end and 210 feet wide at its southerly end. It contains about 144,000 square feet. The location and dimensions of this area are more exactly shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of area to be dredged off Dock No. 6, Grand Junction wharves, East Boston, July, 1895, scale $\frac{1}{16}$." Said plan is referred to and made a part of these specifications.

The amount of material on the above area, between the present bottom and the plane of 27 feet below mean low water, is about 19,500 cubic yards.

The least present depth of water on the above area is about 21 feet at mean low water, and the average cut is about 3.5 feet.

All of the above described area is to be dredged so that it shall have, when the work is completed, a depth of not less than 27 feet below the plane of mean low water. The banks at the edges of the above area to be sloped off sufficiently to maintain the required depth over the whole of said area, and no extra payment or allowance to be made for such sloping, nor for any excavation below the required depth.

The material excavated to be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Light; or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract, without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct; but the party of the second part must examine for itself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid and materials for giving or indicating lines and grade to be furnished by the party of the second part at its own expense; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer, or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances and by such methods as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion; and to be fully completed on or before the first day of September, 1895.

Upon the completion of the work to the satisfaction of the engineer and to the acceptance of said Board, payment will be made to the party of the second part of the sum of \$5,000, and the balance of the contract price will be paid on the first day of February, 1896.

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If the party of the second part refuses, or, in the opinion of the engineer, neglects to prosecute the work, or in any other respect fails to carry out the provisions of the contract, said engineer shall, in writing, certify the facts to said Board, who may then annul the agreement, and, at its option, contract anew with other parties, without prejudice to any claim of the Commonwealth for damages arising from breach thereof.

The word "engineer" as used herein means the engineer of the said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

The words "party of the second part" mean the corporation contracting to do the work, or its agent in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of \$8,570, said sum to be in full therefor, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council ; and the said Eastern Dredging Company, by George E. Runyan, its treasurer, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY, } *Harbor and Land*
JOHN I. BAKER, } *Commissioners.*

EASTERN DREDGING COMPANY,

By GEORGE E. RUNYAN, [SEAL OF EASTERN
Treasurer. DREDGING CO.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, July 31, 1895. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[D.]

[See page 14 of this report, *ante*.]

ARTICLES OF AGREEMENT, MADE THIS SIXTH DAY OF SEPTEMBER, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FIVE, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND THE EASTERN DREDGING COMPANY, A CORPORATION ESTABLISHED UNDER THE LAWS OF THE STATE OF MAINE, AT PORTLAND IN SAID STATE, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for excavating an area in Boston harbor opposite the Hoosac Tunnel docks, all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth:—

Specifications.

The party of the second part is to furnish all the plant, tools, appliances and labor necessary to do the work contracted for, as follows:—

The area to be dredged lies in front of Piers No. 3, 4 and 5, Hoosac Tunnel docks, and extends from the harbor line to the main channel of the harbor. It contains about 71,200 square feet. The location and dimensions of this area are more exactly shown on a plan on file in the office of the Board of Harbor and Land Commissioners, entitled "Plan of area to be dredged off Hoosac Tunnel docks, September, 1895, scale $\frac{1}{800}$." Said plan is referred to and made a part of these specifications.

The amount of material on the above area between the present bottom and the plane of 27 feet below mean low water, is about 4,500 cubic yards.

The least present depth of water on the above area is about 22 feet at mean low water, and the average cut is about 1.7 feet.

All of the above-described area is to be dredged so that it shall

have, when the work is completed, a depth of not less than 27 feet below the plane of mean low water.

The banks at the edges of the above area to be sloped off sufficiently to maintain the required depth over the whole area, and no extra payment or allowance to be made for such sloping nor for any excavation below the required depth.

The material excavated to be dumped in deep water east of a line drawn straight between Egg Rock and Minot's Ledge Light; or such other disposition may be made of the material as shall be approved by said Board.

All ledges and bowlders which may be found, and which can be removed by dredging, to be removed as part of the contract, without extra payment or allowance; but if any ledges or bowlders are found which cannot be removed by dredging, the covering material to be dredged away and the ledges and bowlders left bare to the depth aforesaid; and the engineer of said Board to be the sole judge to determine whether any ledge or bowlder can be removed by dredging or not.

The aforesaid plan, and the surveys and calculations based thereon, are believed to be correct; but the party of the second part must examine for itself, as no allowance will be made for any errors or inaccuracies which may be found therein.

In all questions which may arise concerning measurements, lines and grades, the decision of said engineer to be final.

All necessary aid and materials for giving or indicating lines and grade to be furnished by the party of the second part at its own expense; and convenient facilities for the inspection of the work to be furnished whenever requested.

All instructions and directions of said engineer, or his authorized assistants, to be strictly observed and followed.

All of the work to be done to the satisfaction of said engineer, and with such machinery and appliances, and by such methods, as shall be approved by him, and to the acceptance of said Board.

The work to be commenced as soon as practicable, and to be prosecuted vigorously in all suitable weather until completion, and to be fully completed on or before the twentieth day of September, 1895.

The work will be paid for upon completion to the satisfaction of the engineer and to the acceptance of said Board.

If the party of the second part refuses or in the opinion of the engineer neglects to prosecute the work, or in any other respect fails to carry out the provisions of the contract, said engineer shall in writing certify the facts to said Board, who may annul the same and contract anew with other parties, without prejudice to

any claim of the Commonwealth for damages arising from breach thereof.

The word "engineer" as used herein means the engineer of said Board of Harbor and Land Commissioners, or his authorized assistant in immediate charge of the work.

The words "party of the second part" mean the corporation contracting to do the work, or its agent in immediate charge of the work.

And the said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay the said party of the second part the sum of \$2,270, said sum to be in full therefor, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its said Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council; and the said Eastern Dredging Company, by Augustus R. Wright, its president, thereunto duly authorized, has caused these presents to be signed and delivered in its name and behalf, and its corporate seal to be hereunto affixed.

THE COMMONWEALTH OF MASSACHUSETTS,

By JOHN I. BAKER, }
CHAS. H. HOWLAND, } *Harbor and Land
Commissioners.*

EASTERN DREDGING COMPANY,

By AUGUSTUS R. WRIGHT, [SEAL OF EASTERN
President. DREDGING COMPANY.]

COMMONWEALTH OF MASSACHUSETTS.

In Council, Sept. 12, 1895. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[E.]

[See page 20 of this report, *ante*.]

ARTICLES OF AGREEMENT MADE THIS TWELFTH DAY OF DECEMBER, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FOUR, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND ALFRED SORENSEN, OF BOSTON, IN THE COUNTY OF SUFFOLK AND COMMONWEALTH AFORESAID, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part, to do and complete all the work specified and described in the following specifications for removing a wreck in Hull Bay, all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth: —

Specifications.

The party of the second part is to furnish at his own cost and expense all the plant, apparatus, materials and labor necessary to break up and remove from tide-water and to place on the shore above high-water mark, at some place or places to be approved by the Board of Harbor and Land Commissioners, all and every part of the remains of an old vessel now lying sunken and abandoned in the tide-waters of Hull Bay about on a line between Seal Rocks and the westerly end of Bumkin Island, and about one-third of the way across from Seal Rocks.

So far as the commissioners have learned, the wreck consists of the bottom of an old vessel about 90 feet long. It lies in about 6 feet of water at low water, and is wholly covered at all times.

The above statement as to the character of the wreck and its present location is believed to be correct; but the party of the second part must examine for himself, as no allowance will be made for any error or inaccuracy which may be found in it.

After breaking it up, all the material now composing the wreck is to be removed and placed on the shore above high-water mark, and none is to be allowed to remain in tide-water at any place.

All the work to be subject to the approval and direction of the engineer of the Board of Harbor and Land Commissioners, and to the satisfaction of said Board.

The work of removal shall be begun in season to have it completed at the time specified, and it shall be completed on or before May 1, 1895. The party of the second part shall save the Commonwealth harmless from all liability for damages to any person or property caused by or in any way arising from the carrying out of the work.

The work to be paid for upon its completion and acceptance.

And said party of the first part, in consideration of the performance and completion of all of said work in the manner and in accordance with the terms and conditions aforesaid, hereby covenants and agrees to pay said party of the second part the sum of \$440, the same to be in full compensation for all the work and other things done, furnished, performed and completed as aforesaid, and to be paid at the times and in the manner and upon the terms and conditions set forth in the foregoing specifications.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth of Massachusetts, acting by its Board of Harbor and Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the seal of the Commonwealth to be hereunto affixed, and has also caused these presents to be approved by its Governor and Council; and the said Alfred Sorensen has hereunto set his hand and seal.

THE COMMONWEALTH OF MASSACHUSETTS,

By WOODWARD EMERY,	}	<i>Harbor and Land Commissioners.</i>
JOHN I. BAKER,		
CHAS. H. HOWLAND,		

ALFRED SORENSEN.

In Council, Dec. 20, 1894. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[F.]

[See page 21 of this report, *ante*.]

ARTICLES OF AGREEMENT MADE THIS THIRTIETH DAY OF JULY, IN THE YEAR EIGHTEEN HUNDRED AND NINETY-FIVE, BY AND BETWEEN THE COMMONWEALTH OF MASSACHUSETTS, ACTING BY ITS BOARD OF HARBOR AND LAND COMMISSIONERS, PARTY OF THE FIRST PART, AND GEORGE W. TOWNSEND OF BOSTON IN SAID COMMONWEALTH, PARTY OF THE SECOND PART.

The said party of the second part hereby covenants and agrees with the said party of the first part to do and complete all the work specified and described in the following specifications for the removal of the wreck of the steamship "Venetian," now lying in Boston harbor, all of said work to be done and completed in the manner and in accordance with and subject to the terms and conditions in said specifications set forth : —

Specifications.

The party of the second part is to take charge and possession of the wreck on August 1, and to furnish at his own expense all the tools, plant, materials and labor necessary to do and complete the following work, viz. : —

The iron steamship "Venetian," now lying wrecked on State Ledge in Boston harbor, together with all property which is now attached to or within her hull, is to be wholly removed from tide-water, or removed to such place or places as may be approved by the Board of Harbor and Land Commissioners.

The work of removal shall be commenced at once upon the execution of the contract, and prosecuted in such a manner that it will be completed on or before Nov. 30, 1896.

It is agreed that at least eight men shall be constantly employed upon the work, excepting in the months of January, February and March.

In no event will the commissioners agree that any part of the material to be removed shall be left in or near any channel in Boston harbor.

The party of the second part will be required to deposit with the Board of Harbor and Land Commissioners the sum of \$5,000, the same to be held by them during the execution of said work, and to be returned upon the completion of said work by said party of the second part to the satisfaction and approval of said Board, or to give a bond satisfactory to this Board.

If for any cause the party of the second part should fail to complete said work of removal within the time (original or extended) agreed upon, or, except in the months of January, February and March, should cease work or employ less than eight men upon the same, and not recommence and prosecute said work continuously with eight or more men within one month after being notified so to do by said Board of Harbor and Land Commissioners, said sum shall be forfeited to the use of the Commonwealth, and said Commonwealth may contract anew with other parties for the completion of said work of removal.

The work of removal and of the sale of the material shall at all times be open to inspection by the agents of said Board, and convenient facilities shall be furnished by the party of the second part for such inspection whenever requested, and full information as to the disposal of all parts of the wreck shall be at all times fully given.

The work shall be so conducted that no obstruction to navigation shall be placed or allowed to remain in the main channel of the harbor.

The party of the second part to take the necessary measures to warn vessels away from the vicinity of the wreck, and between sunset and sunrise shall maintain lights on said wreck or at its present position so long as any part of it remains.

The party of the second part must assume responsibility for all damage which may be occasioned by or be in any way due to the work of removal, and must save the Commonwealth harmless from any suits which may arise out of said work of removal.

Upon the completion of the work of removal by said party of the second part to the satisfaction and acceptance of said Board, ninety-nine per centum of all the right, title and interest which the Commonwealth has or may have in and to all the material removed, or in the proceeds of the sale of such material, shall be transferred and assigned to the party of the second part, the same to be in full satisfaction for all things furnished and done under this agreement, and for all costs and expenses incurred by him in the performance of the same.

IN WITNESS WHEREOF, on the day and year first above written, the said Commonwealth, acting by its said Board of Harbor and

78 HARBOR AND LAND COMMISSIONERS. [Jan.

Land Commissioners, has caused these presents to be signed and delivered in its name and behalf, and the same to be approved by its Governor and Council ; and the said George W. Townsend has hereunto set his hand.

THE COMMONWEALTH OF MASSACHUSETTS,

By	WOODWARD EMERY,	}	<i>Harbor and</i>
	JOHN I. BAKER,		<i>Land</i>
	CHAS. H. HOWLAND,		<i>Commissioners.</i>

GEO. W. TOWNSEND. [SEAL.]

In Council, July 31, 1895. Approved.

[SEAL OF THE
COMMONWEALTH.]

E. F. HAMLIN,
Executive Clerk.

[G.]

[Circular notice. See page 20 of this report, *ante*.]

HARBOR AND LAND COMMISSIONERS' OFFICE,
COMMONWEALTH BUILDING, 65 BOWDOIN STREET,
BOSTON, Feb. 8, 1895.

SIR: — By section 8, chapter 261, Acts of 1854, the Commonwealth asserted and declared its title as owner in fee to all the province lands within the town of Provincetown.

By chapter 470, Acts of 1893, the Commonwealth charged this Board with the general care and supervision of the province lands lying within certain bounds which have been fixed and marked plainly so as to be objects of comparatively easy recognition.

This Board is informed that during the year 1894 you have used a portion of the lands so placed under the care of this Board, and the products thereof. If such be the case, you are hereby requested to file in writing with Capt. James A. Small, superintendent of province lands, at Provincetown, on or before the first day of April, 1895, the nature of the use you have so made, with a description of the parcel of land you have so used, and the authority under which you claim to have so used it, to the end that some fair and equitable compensation may be arranged therefor. Any further use of any of the aforesaid lands made by any one hereafter, without the license of this Board, will be made at such user's peril, subject to the provisions of the law and of the statutes thereto applicable.

For the Board of Harbor and Land Commissioners,

WOODWARD EMERY,
Chairman.

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